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Mesodiverticular Band of Meckels Diverticulum Resulting in Bowel Obstruction: A Case Report

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Abstract: ***Meckels diverticulum, a common congenital anomaly of the gastrointestinal system, can lead to rare but serious complications such as small bowel obstruction due to a mesodiverticular band. This case report presents a 21yearold male with acute symptoms of bowel obstruction, where imaging initially revealed dilated small bowel loops. Despite conservative management, the patient's condition deteriorated, necessitating emergency surgery. Intraoperatively, a mesodiverticular band was identified, causing gangrenous bowel changes. Surgical resection and repair were performed, and the patient recovered without complications. This report highlights the importance of considering mesodiverticular band in young patients with small bowel obstruction and no prior surgical history, and underscores the role of CT imaging in its diagnosis.***

Keywords: Meckels diverticulum, mesodiverticular band, small bowel obstruction, emergency laparotomy, CT imaging

1. Introduction

Meckel's diverticulum is the most common congenital anomaly of the gastrointestinal system. [1 - 3]. It is usually located on the antimesenteric border of the ileum. It originates from failure of the vitelline duct to obliterate completely. Its incidence is between 1% and 3% [2, 4, 5]. It has been observed that most of the Meckel's diverticula are discovered incidentally during a surgical procedure performed for other reasons. Presenting symptoms include haemorrhage, small bowel obstruction, diverticulitis, intussusceptions and perforation. In symptomatic patients, histologically, heterotopic gastric and pancreatic mucosa are frequently observed in the diverticula [1, 3]. Various mechanisms leading to small bowel obstruction by Meckel's diverticulum include intussusception of an inverted Meckel's diverticulum, volvulus, Littre's hernia and internal herniation of the small bowel underneath the mesodiverticular band. In this case report we were able to clearly demonstrate the mesodiverticular band, its diagnosis and management.

2. Clinical Presentation

A 21 - year - old male was admitted to the emergency department with abdominal pain (around umbilicus which further localised to right lower abdomen) since 2 days, no passage of flatus and faeces since 1 day, multiple episodes of vomiting and nausea since 1 day.

His past medical and surgical history were unremarkable. On physical examination, the abdomen was mildly distended but no features of peritonitis noted. Vitally the patient had tachycardia. Laboratory tests performed showed elevated levels of white blood cell count ($18.1*10^3$ cells/mm3) and deranged KFT (S. Urea - 56mg/dl, S. Creatinine - 1.54 mg/dl).

3. Imaging

Plain X ray showed markedly dilated jejunal loops [fig.1]. CECT abdomen showed dilated small bowel including jejunum and proximal ileum, transition point in mid ileum followed by collapsed distal ileum [fig.2].

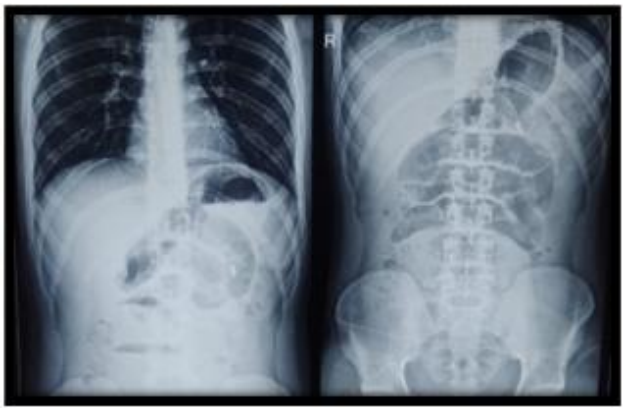


Figure 1: Plain X - Ray Skiagram Abdomen AP View (Erect and Supine)

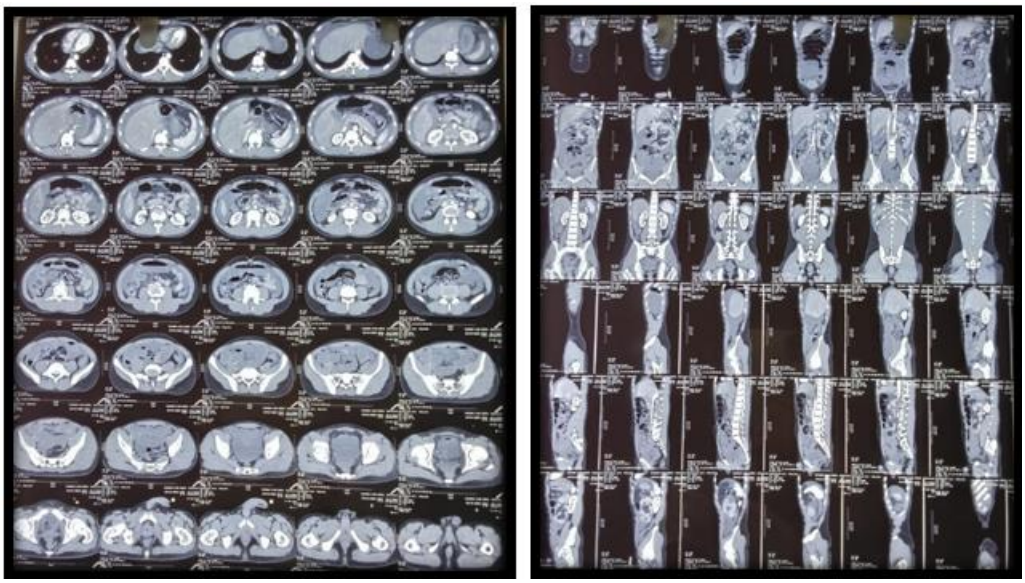
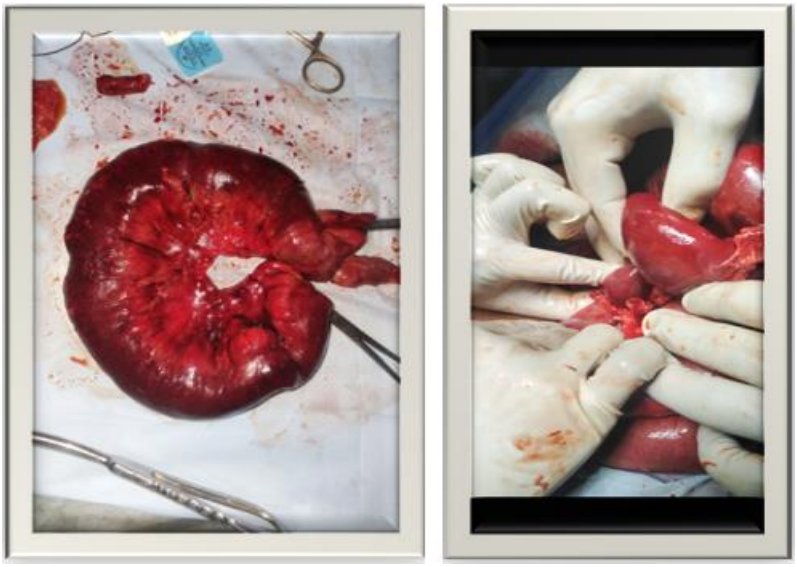


Figure 2: CECT abdomen with oral and iv contrast

4. Treatment and Outcomes

As there were no signs of peritonitis or bowel perforation a conservative management trial for 72 hours was given under which the patient was nil per oral and iv fluids, antibiotics and analgesics were given along with per rectal stimulation. As the patient was not relieved and further abdominal distension and rigidity progressed accompanied by fever and tachycardia, we performed an emergency laparotomy and as the small bowel loops were found to be markedly dilated, the bowel was explored from the duodeno - jejunal flexure to the ileocecal valve. The Meckel's diverticulum was noted forming a meso diverticular band around mid - ileum, the bowel herniated through this showed gangrenous changes. Primary Ileo - ileal repair was done after resection of the gangrenous segment. The patient was closely monitored for vitals in post operative period, orally allowed by day 4 and discharged by day 7 without any complications.



5. Discussion

Meckel's diverticulum is considered to be a remnant of the omphalomesenteric duct (vitello intestinal duct), which connects the yolk sac with the developing midgut in foetal life. It normally regresses by the seventh to eighth week of gestation. However, incomplete regression (involution) leads to various congenital anomalies such as omphalomesenteric duct cyst, umbilico - ileal fistula, umbilical sinus and Meckel's diverticulum. The diverticulum usually occurs at the antimesenteric border of the ileum within 2 feet of the ileo - caecal junction and is about 2 inches in length. The arterial supply comes from ileocolic branches of the superior mesenteric artery. Sometimes an embryologic band extending from the adjacent mesentery to the tip of the diverticulum forms which creates a window through which bowel loops may be herniated and obstructed [6].

Acute intestinal obstruction accounts for one of the commonly observed clinical entities in the emergency departments. The most common causes are adhesions and neoplasms, while internal hernias are responsible for only 0.05–4.1% of the cases with intestinal obstruction [7, 8]. Early diagnosis and treatment are extremely crucial, if surgery delayed beyond 36 hours the mortality rate increases from 8% to 25% in patients with complications due to strangulation [9].

Intestinal obstruction owing to mesodiverticular band has been reported in patients with Meckel's diverticulum [10 - 14]. In addition, Vork et al have implicated the high mortality rate in patients presenting as obstruction due to mesodiverticular band and the importance of immediate surgery [15]. In such patients, internal herniation of the small bowel loops underneath the mesodiverticular band is the main mechanism for bowel obstruction, as seen in the presented case. Such patients always require surgical intervention and band resection.

To make a correct diagnosis preoperatively of Meckel's diverticulum complicated by small bowel obstruction is difficult, imaging not being so helpful and conclusive and considering plethora of possibilities of obstruction, it is less likely to cross the mind.

Imaging features of the mesodiverticular band of the Meckel's diverticulum have been published [11, 12]. Sun et al suggested that the mesodiverticular band appears to be a hyperechoic line in their cases. They also emphasized that CT is superior to ultrasonography in locating the aetiology of small bowel obstruction accurately in adult or obese patients [16].

An uncomplicated Meckel's diverticulum appears to be similar to normal small bowel on a CT scan. Meckel's diverticulum appears as a blind - ending tubular segment or diverticular sac containing fluid. In a previous study, it has been reported that the majority of Meckel's diverticula are located at or near midline [17]. In our case, the mid ileum was identified as a transition zone, with collapsed distal loops on pre - operative CT. Adhesion was excluded, as our patient had not undergone any abdominal surgery previously.

We are reporting a mesodiverticular band of Meckel's diverticulum leading to small bowel obstruction. Although it is hard to establish a pre - operative diagnosis, several CT features may suggest the diagnosis. First, fluid–air filled a blind - ending pouch arising from the antimesenteric side of the distal ileum, strongly suggestive of Meckel's diverticulum. Second, the presence of a bridge or band - like lesion connecting the tip of the Meckel's diverticulum to the root of the mesentery. Third, characteristic CT findings of internal hernia, including converging mesenteric vessels or bowel loops. These findings support the appropriate diagnosis of mesodiverticular band in the setting of Meckel's diverticulum [18].

To summarise, the mesodiverticular band of Meckel's diverticulum causing mechanical small bowel obstruction is a rare complication. It should be excluded in the presentations of a small bowel obstruction, especially in young patients with no previous history of abdominal surgery. CT is a very useful diagnostic tool in its diagnosis.

Learning Points:

1) In cases of small bowel obstruction, particularly in patients with low probability for adhesive obstruction, a meso diverticular band due to Meckel's diverticulum should be considered.

2) Mesodiverticular band is rare and it is difficult to diagnose it preoperatively.
3) Certain characteristic CT features of the mesodiverticular band of Meckel's diverticulum can be helpful to make the correct diagnosis preoperatively and prevent fatal complications.

Consent

Written informed consent for the case to be published (including images, case history and data) was obtained from the patient (s) for publication of this case report.

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