CASE REPORT

Acute small bowel obstruction due to Meckel's diverticulum: An unusual presentation

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Abstract

Majority of the persons with Meckel's diverticulum are asymptomatic throughout life. In the symptomatic adults, small bowel obstruction is the most common presentation. The common mechanisms of small bowel obstruction include intussusception, and volvulus around fibrous bands adherent to the umbilicus. A patient with acute closed loop obstruction and strangulation of small bowel due to Meckel's diverticulum by a rare mechanism is described in this article. The signs of closed loop obstruction and importance of evaluating the signs of strangulation in a patient with closed loop small bowel obstruction are emphasized here.

Keywords: Meckel's diverticulum; closed loop obstruction; bowel strangulation; acute intestinal obstruction

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Received 12 December 2015; *Revised* 19 February 2016; *Accepted* 24 February 2016; *Published* 31 March 2016

Citation: Sandeep P, Papalkar A, Prasad MBV, Varma BM. Acute small bowel obstruction due to Meckel's diverticulum: An unusual presentation. J Med Sci Res. 2016; 4(2):76-79. DOI: http://dx.doi.org/10.17727/JMSR.2016/4-018

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Introduction

Small bowel obstruction accounts for 20% of all surgical emergencies. Small bowel obstruction can be a simple obstruction or a closed loop obstruction. Simple obstruction is associated with fewer complications and is managed conservatively or by delayed surgery. Closed loop obstruction is associated with increased complications, morbidity and mortality and usually requires immediate surgery. Closed loop obstruction is more prone for strangulation. Therefore, preoperative diagnosis of, the type of obstruction and the presence of strangulation is important. The aetiology of small bowel obstruction includes several causes, postoperative adhesions being the most common cause [1]. Meckel's diverticulum is most commonly symptomatic in children under the age of 2 years [2]. The frequency of symptomatic Meckel's diverticulum decreases with age. Intestinal obstruction is most common presentation in adults [3, 4].

Case report

A 28-year-old female was admitted in KIMS hospital, Secunderbad as a suspected case of mesenteric ischemia, for further management, with history of diffuse abdominal pain of 36 hours duration. The pain was sudden in onset, severe in intensity, intermittent initially and later became continuous and diffuse. She gave history of lower segment caesarean section getting done twice. There was no history of similar abdominal pain in the past.

On clinical examination, there was diffuse abdominal distension, along with non-specific tenderness all over the abdomen. For further evaluation CT scan of abdomen with intravenous contrast was done. The scan revealed dilated jejunal and ileal loops with multiple air-fluid levels. Beak like narrowing of ileal loops was seen at two levels at proximal ileum and distal ileum, with collapsed ileal and colonic loops distal to it, suggesting a high grade obstruction. The dilated ileal loop between the two points of luminal occlusion showed thickened and hypo-enhancing wall, suggesting oedematous and ischemic bowel. The afferent and efferent limbs of the loop showed luminal narrowing and whirling along with mesenteric vessels at the point of narrowing, suggesting a volvulus (Whirl sign) (Figure 1). The ileal loops were arranged in radial array with folds of oedematous mesentery and blood vessels converging towards point of whirling (Figure 2). Gross ascites was noted. Based on the history and CT findings, a diagnosis of closed loop obstruction of ileum with ischemia of involved loops was made.

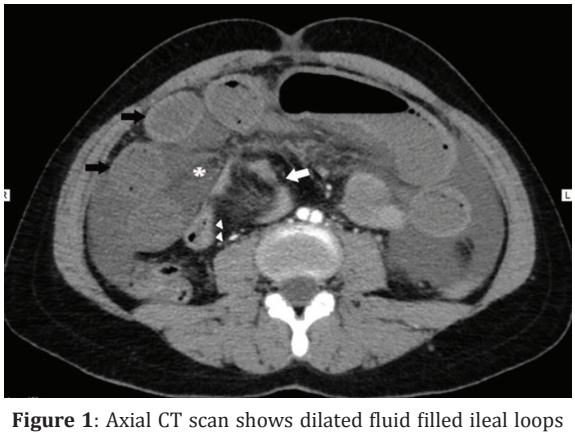

Figure 1: Axial CT scan shows dilated fluid filled ileal loops with hypo enhancing walls (black arrows) and edematous mesentery converging towards transition point (white arrow). There is whirling of narrowed loop (White arrow). Distal ileal loop (white arrow heads) is collapsed and shows normal wall enhancement.

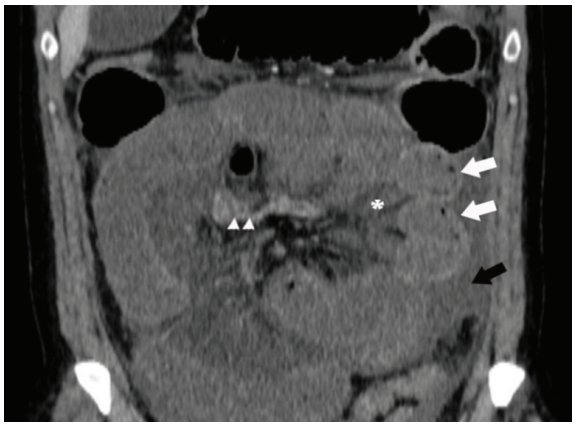

Figure 2: Coronal CT scan shows dilated ileal loops arranged in radial array (white arrows) with folds of oedematous mesentery (*) and blood vessels converging towards point of transition. Distal ileal loop (white arrow heads) is collapsed and shows normal wall enhancement. Gross ascites (black arrow) is noted.

The patient was operated. Laparotomy showed a dilated, gangrenous ileal loop. On tracing distally, a Meckel's diverticulum was found, which was seen revolving around the point of obstruction (Figure 3). The tip of Meckel's diverticulum was gangrenous and showed signs of adhesion to mesentery. Resection of gangrenous bowel was done and end to end ileal anastomosis was done.

Figure 3: Intraoperative photograph showing dilated gangrenous ileal loops and a Meckel's diverticulum forming a constricting loop at the point of obstruction.

Retrospective review of the preoperative CT scan showed a suspicious thin, enhancing bowel loop with a non-enhancing tip, arising from terminal ileum and encircling the point of obstruction (Figure 4), confirming the operative findings. The postoperative course was uneventful and patient was discharged after 10 days.

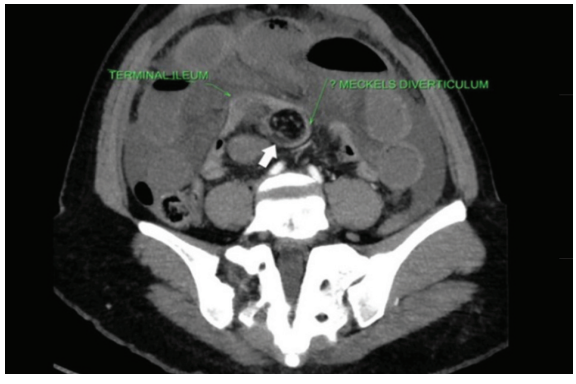

Figure 4: Oblique axial reformation of CT scan of abdomen shows suspicious thin, enhancing bowel loop with a non-enhancing tip (white arrow), arising from terminal ileum and encircling the point of obstruction.

Pathology confirmed the presence of a Meckel's diverticulum, with necrotic muscular wall, denuded mucosa and serositis.

Discussion

Mechanical intestinal obstruction is of two types, which are simple obstruction and closed loop obstruction. A simple obstruction shows occlusion of bowel at one or more points along its course and variable dilatation of proximal bowel depending on the duration and severity of the process. A closed-loop obstruction is a type of intestinal obstruction in which two points along variable length of a bowel are occluded at a single location. Usually, a simple obstruction is managed by a conservative or a delayed surgical approach. A closed loop obstruction is associated with increased morbidity and mortality, if the diagnosis is delayed. Therefore, establishing the type of obstruction pre-operatively is important [5].

CT findings in closed-loop obstruction depend on the length, degree of distension and orientation of the closed loop in the abdomen. Horizontally oriented short segment closed small bowel loop may show U- or C-shaped configuration [5-7]. A radial array of bowel loops with oedematous mesentery and mesenteric vessels converging towards site of obstruction is seen. Tapering of the bowel loop at the site of torsion, described as Beak sign [7], can be seen. Twisting of mesentery and mesenteric vessels at the site of torsion in patients with small bowel volvulus can be seen and has been described as "Whirl sign" [7]. The involved loop may be entirely or almost entirely filled with fluid, whereas proximal intestinal loops usually contain air-fluid levels [5].

Identification of closed loop obstruction is important because a mobile dilated bowel loop with a narrow pedicle allows rotation of involved loop along its long axis leading to volvulus, which aggravates mechanical obstruction and development of ischemia [5]. Thus, a closed loop small bowel obstruction is more prone to strangulation and has high mortality rate [7]. In strangulation, the mesenteric veins draining the involved bowel loop are occluded first, which leads to congestive changes affecting the bowel wall and mesentery. Venous and capillary pressures increase leading to oedema, rupture of small vessels, and mesenteric and intramural haemorrhage, which are seen on non-contrast computed tomography as hyperdense areas in the involved bowel wall. Later arterial insufficiency ensues, which aggravates the anoxia and further contributes to the rapid development of ischemia, infarction, and may lead to perforation. The development of complications is determined by severity and duration of the obstructive process [5].

The CT findings in strangulation include circumferentially thickened loop with high attenuation within the wall, the "Target sign" [7], congestion or haemorrhage in the mesentery attached to the closed loop. A more specific finding is asymmetric or hypo enhancement of the bowel wall. In advanced cases, non-enhancement of the bowel wall and pneumatosis intestinalis are seen. Involved bowel can be salvaged by early identification of strangulation. Therefore, a high index of suspicion for strangulation should be maintained and careful evaluation for signs of strangulation should be done in every case of closed loop obstruction.

Small bowel obstruction accounts for 20% of all surgical emergencies [1]. Postoperative adhesions are the most common cause of small bowel obstruction, ranging from 50%–80% of all cases. Meckel's diverticulum as a cause of small intestinal obstruction is rare.

Meckel's diverticulum (MD) is a remnant of vitellointestinal duct. It is usually located in the antimesenteric border of the ileum, 30-100cm proximal to the ileocaecal valve. Meckel's diverticulum is a true diverticulum, containing all layers of the ileal wall, where heterotrophic tissue is present. It is the most common congenital anomaly of small intestine and is usually asymptomatic throughout life. Mechanisms of obstruction by Meckel's diverticulum are volvulus, intussusception [8], being common causes [3, 9] and other rare causes are litter's hernia [10], enterolith [11], faecal impaction [12], mesodiverticular band [2, 13, 14], phytobezoar [15], neoplasm. As seen in this case, Meckel's diverticulum encircling ileal loop due to adhesion of its tip with the mesentery is an unusual cause of obstruction, which makes this case interesting. Few cases were previously reported in the literature, where an internal hernial orifice was created by the Meckel's diverticulum as the result of adhesions or bands between an inflammatory end of the diverticulum and either the surrounding mesentery [16] or the neighbouring appendix [17], or by formation of knot [18] or by looping around ileum without adhesions [19].

Conclusion

Meckel's diverticulum should be considered as a cause of intestinal obstruction in all age groups and even in a patient with previous history of abdominal surgery. Closed loop small bowel obstruction is more prone to strangulation and therefore, careful evaluation for signs of strangulation should be done. Imaging plays a major role in establishing the type of obstruction pre operatively.

Acknowledgement

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Conflicts of interest

The authors declare no conflicts of interest.

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