



A Rare Complication of Closed Loop Obstruction with Mesenteric Volvulus Due to Jejunal Diverticulosis—a Case Report

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Abstract

Jejunal diverticulosis is a rare condition seen in 1–2% of the population and is asymptomatic in 80% of its patients. It can however rarely produce life-threatening complications such as perforation, bleeding, and obstruction. Diagnosis is often delayed in such patients causing high mortality. We report a 79-year-old gentleman presenting with intestinal obstruction for 2 days with peritoneal signs. CT revealed jejunal dilatation with twisting of mesentery with whirlpool sign and closed loop obstruction of jejunum. A differential diagnosis of jejunal diverticulosis should be considered when encountering patients in the elderly age group in an emergency setting.

Keywords Volvulus · Jejunal diverticulosis · Intestinal obstruction · Emergency surgery · Closed loop · Case report

Introduction

Diverticular disease is essentially a disease of old age uncommon under the age of 40 years. Small bowel diverticulosis is rare compared to large bowel diverticulosis with duodenal diverticulosis five times more common than jejunoileal diverticulosis [1]. The incidence of jejunal diverticulosis varies from 0.2 to 1.3% in autopsy studies [2]. Small bowel motility disorders with increased intraluminal pressure are considered to be the main etiological factors in development of jejunal diverticulosis [3, 4]. Majority of patients with jejunal diverticulosis are asymptomatic with 10–15% of patients demonstrating non-specific symptoms such as dyspepsia, flatulence, or constipation. Obstruction can however occur in few cases necessitating urgent laparotomy. If undetected, obstruction can progress to bowel ischemia and gangrene with multiple organ failure leading to high mortality and morbidity. In our case report, we present a 79-year-old gentleman who presented with 2 days of obstipation and abdominal pain. Clinical, imaging, and intra-operative findings revealed features of closed loop

obstruction of jejunal loops with volvulus due to mesodiverticular band arising from proximal jejunal diverticuli.

Case Presentation

A 79-year-old gentleman with no prior medical or surgical history presented with intermittent colicky abdominal pain associated with lower abdominal distension and ball rolling movements in the abdomen for 2 days. He also had history of constipation for 1 week followed by obstipation for 1 day. There was no history of altered bowel habits, bleeding per rectum, anorexia, or weight loss. There was no significant past, medical, family, or psycho-social history.

On examination, patient had tachycardia (heart rate 110/min) and was dehydrated. Physical examination revealed tenderness and guarding over umbilical and epigastric region with exaggerated bowel sounds. Blood investigations showed hemoglobin of 11 g/dL, urea of 52 mg/dL, creatinine of 1.28 mg/dL, sodium of 129 mEq/L, and potassium of 4.2 mEq/L. On further evaluation, X-ray abdomen (Fig. 1) was done which revealed air fluid levels with dilated jejunal loops suggestive of small bowel obstruction. Contrast-enhanced computed tomography (CECT) of abdomen (Fig. 2a–b) revealed clockwise twisting of jejunal loops around its mesentery in the infra-umbilical region along with stretching of SMV tributaries; the proximal jejunal loops

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Fig. 1 Supine X-ray of abdomen showing dilated jejunal loops

appeared dilated with closed loop obstruction with a maximum caliber of 3.7 cm; ileal loops were collapsed.

In view of peritoneal signs and suspicion of closed loop obstruction, the patient was taken up for emergency exploratory laparotomy. Intraoperatively, there was a 180° twist of jejunal mesentery (Fig. 3) about 30 cm from duodeno-jejunal flexure; three large diverticula were noted each measuring 7 × 5 cm in size, at mesenteric border, approximately 12 cm, 24 cm, and 30 cm from duodeno-jejunal flexure. The third diverticulum appeared inflamed and congested. After untwisting of the mesentery, two fibrotic bands were noted (Fig. 4), 4 cm and 5 cm from duodeno-jejunal flexure. The bands could have formed due to repeated episodes of subclinical diverticulitis. The first band ended at the third diverticulum (mesodiverticular band) and second band ended near ascending colon. Both the bands were released by cautery. Post band release, derotation of mesentery, and warm saline pad application, congestion of the third jejunal diverticulum reduced.

Bowel resection was not done as there was no evidence of perforation, gangrene, or diverticulitis. Advanced age of the patient was another factor which influenced the decision for a band release and avoid bowel resection. Thin-walled diverticula are at increased risk of perforation. However, in our patient, the jejunal diverticula were thick-walled which reduced the chance of perforation due to which diverticulectomy or bowel resection was not done. His post-operative

period was uneventful. The patient was started on orals on second post-operative day and was discharged by post-operative day 5.

Discussion

Jejunioileal diverticulosis is rare, reported in 1–2% of the population [5]. The first report of jejunal diverticula dates back to 1807 by Sir Astley Cooper [5]. Incidence rates range from 0.3 to 1.3% in autopsy series and 2.3% in imaging studies; reported cases are even fewer in number [2]. Jejunal diverticula are usually acquired, false diverticula, and multiple in number [6]. They occur at the mesenteric border in contrast to a true congenital Meckel's diverticulum [7].

Various theories have been proposed to explain the occurrence of jejunal diverticula. One theory proposed deficiency of dietary fiber causing abnormalities in intestinal peristalsis with pseudo-obstruction resulting in higher intraluminal pressure. Areas of focal smooth muscle weakness, at entry point of blood vessels, have also been discussed as a cause for diverticulosis [6]. Another theory postulates that an abnormal mesenteric plexus induced smooth muscle dysfunction and uncoordinated peristalsis leads to localized areas of high pressure and subsequent diverticulosis [4, 8]. Krishnamurthy et al. reported jejunal diverticulosis to be a consequence of abnormalities in either the smooth muscle of bowel wall or myenteric plexus. In their study, pathological examination revealed smooth muscle changes consistent with progressive systemic sclerosis or visceral myopathy and myenteric plexus neuronal changes similar to familial visceral neuropathy [4].

Most of the patients with jejunal diverticulosis are asymptomatic, with acute or chronic symptoms reported by 10–19% of patients. Symptomatic patients tend to be in their 7th–8th decade with a male preponderance [9].

Nearly 60% of symptomatic patients have chronic complaints related to intestinal motility or intestinal malabsorption and misdiagnosed as dyspepsia or irritable bowel syndrome [3]. In 10–20% of patients, acute complications such as diverticulitis, perforation, obstruction, and bleeding can occur [10]. Obstruction due to jejunal diverticulosis occurs in 2.3–4.6% of cases.

Cause of obstruction includes inflammatory mass, stricture or adhesions due to diverticulitis, volvulus due to meso-diverticular band, intussusceptions due to enterolith, and extrinsic compression of an intestinal loop with a large diverticula [11]. Large size of the jejunal diverticula (> 3 cm) could predispose to midgut volvulus [12].

Due to the non-specific complaints encountered in small bowel diverticulosis, diagnosis is generally arrived after radiological investigation. The first radiological diagnosis of jejunioileal diverticulosis was reported on barium contrast

Fig. 2 **a** Contrast enhanced CT showing twisted bowel loops with mesenteric twist. **b** Contrast enhanced CT showing jejunal loop with diverticula



study in 1915 [6]. In current era, ultrasound is usually the first investigation which can detect bowel wall thickening with hypoechoic rim and hyperechoic center. However, in case of acute presentation like obstruction or perforation, X-ray is usually the first investigation with no further investigation required depending on X-ray findings and clinical condition of the patient. Given the low sensitivity and operator dependence of ultrasound, CECT has become the investigation of choice [6]. Administration of oral and intravenous contrast increases the sensitivity. Oral contrast is used to assess bowel wall thickening, stricture formation, or intraluminal mass and intravenous contrast detects inflammatory changes. Moreover, CECT has shown higher sensitivity for

complications like diverticulitis, obstruction, perforation, intussusceptions, volvulus, and intra-abdominal abscess [6]. However, imaging may miss half of symptomatic small bowel diverticula prior to surgery [13]. Device-assisted enteroscopy and capsule endoscopy have emerged as attractive options for detection of jejunal diverticulosis in patients with non-specific symptoms. However, they are contraindicated in patients presenting with complicated jejunal diverticulosis [14].

Surgical management is required in 8.5% of all patients with jejunal diverticulosis which is more frequent in patients with symptomatic diverticulosis associated with complications [2]. Surgical excision with end to end anastomosis is



Fig. 3 Intra-operative photograph showing mesenteric twist of small bowel loops



Fig. 4 Intra-operative photograph showing multiple jejunal diverticula with meso-diverticular band

the ideal procedure to be done in jejunal diverticulosis with perforation, necrosis, or stenosis due to inflamed diverticula [15]. The length of bowel resection must be limited to the area of bowel containing inflamed diverticula to avoid complications of short bowel syndrome in cases of diffuse small bowel diverticulosis [6]. Diverticulectomy should be avoided in view of high failure rate.

There is no evidence at present to treat asymptomatic diverticulosis detected incidentally [2]. Patients with symptomatic diverticulosis presenting with chronic abdominal pain or malabsorption are treated conservatively with a combination of analgesics, anti-diarrheal agents with anti-spasmodic agents with variable success rate. In symptoms suggestive of bacterial overgrowth, oral antibiotics such as tetracycline and erythromycin are prescribed [6]. Patients presenting with mild diverticulitis can undergo a trial of conservative management with bowel rest and parenteral antibiotics. Rate of recurrence is high with conservative management and hence the primary pathology to be addressed once the inflammation subsides [15]. In the event of diverticular perforation with peri-diverticular abscess or collection less than 5 cm, CT-guided drainage with parenteral antibiotics is provided. However, recurrence is common with patients

returning with symptoms after hospital discharge and requiring admission. The number of studies with patients managed conservatively for complications of jejunal diverticulosis is less due to the low incidence of jejunal diverticulosis.

Jejunal diverticulosis is a rare condition encountered in the elderly population with patients who are asymptomatic or having non-specific symptoms. However, knowledge of small diverticulosis especially of its associated complications of obstruction, perforation, and bleeding should be remembered as a differential diagnosis when encountering patients in this age group in an emergency setting. Patients with vague abdominal symptoms or recurrent symptoms in this age group need to be evaluated further. Wider use and advances of CT enteroclysis, capsule endoscopy, and device-assisted enteroscopy may pick up the disease earlier. Although rare, small bowel diverticulosis should not be treated as insignificant.

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literature search, manuscript editing, and reviewing of the manuscript. Dr. Sree Subramaniam: project writing and management, defining the study, extensive literature search, performing the study, practical work, operative work, and manuscript writing. Dr. Angeline Mary Samy: project writing and management, defining the study, extensive literature search, performing the study, practical work, operative work, manuscript writing, and editing and reviewing of the manuscript.

Data availability Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.

Code Availability Not applicable.

Declarations

Ethics Approval Not applicable.

Consent to Participate Informed consent was obtained from the individual participant included in the case report.

Consent for Publication The participant has consented to the submission of the case report to the journal.

Competing Interests The authors declare no competing interests.

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