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A rare case of Non-Meckel's Ileal diverticular perforation due to occupational manoeuvre

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Abstract

The incidence of Non-Meckel small bowel diverticulosis is rare. It is less than 1% of the population. Duodenum is the commonest site, followed by jejunum and rarely ileum. The causes of Ileal perforation are many. According to literature the commonest cause is spontaneous ileal perforation. Other causes are tuberculosis, typhoid, lymphoma, immunocompromised conditions, trauma, long standing steroid therapy and bowel obstruction. Non-Meckel Small bowel diverticula in the majority are false diverticula as they lack muscular wall which true diverticulum possesses.

The incidence of ileal diverticular perforation is rare. In our case, it was due to continuous compression by the patient on a pneumatic power drill against the abdominal wall in Valsalva manoeuvre as part of patient's occupation. This resulted in perforation of an already existing, asymptomatic ileal diverticulum, and presented as an acute abdomen. The patient underwent resection-anastomosis of the ileal segment, which on biopsy revealed a diverticulum with gastric and pancreatic tissue.

Keywords: Non-Meckel's, Ileal diverticulum, perforation, occupational hazard, ectopic, gastric and pancreatic tissues

Introduction

Ileal diverticulitis is a diagnosis that is rarely encountered. These diverticula are mostly false diverticula. Most patients with ileal diverticulosis are asymptomatic [1, 2]. When ileal diverticulosis becomes diverticulitis, the patient may present with right lower quadrant pain and a clinical picture that leads to suspicion of acute appendicitis [7, 8]. Most cases are treated conservatively with intravenous antibiotics and bowel rest. But the case discussed below presented with acute features in a rare scenario. Emergency surgical intervention was done which was life-saving. Non-Meckel's ileal diverticular perforation is a rare and unusual condition characterized by the rupture of diverticula located in the ileum, which is distinct from Meckel's diverticulum. Meckel's diverticulum is a congenital abnormality, whereas non-Meckel's ileal diverticula are acquired and often associated with underlying conditions or occupational maneuvers. This case report presents a rare occurrence of non-Meckel's ileal diverticular perforation resulting from an occupational maneuver. Ileal diverticula are rare compared to diverticula in other parts of the gastrointestinal tract, such as the colon. Non-Meckel's ileal diverticula are typically found in older individuals and are associated with conditions such as small bowel diverticulosis, Crohn's disease, or previous abdominal surgeries [3, 4]. They are characterized by outpunching's or herniations of the intestinal wall, particularly in the distal ileum. Diverticula in the small intestine are often asymptomatic and discovered incidentally during diagnostic procedures or surgery. However, in some cases, complications can arise, including diverticulitis, perforation, bleeding, or obstruction. Perforation of non-Meckel's ileal diverticula is extremely rare and usually occurs due to increased pressure or trauma to the intestinal wall. Occupational maneuvers involving repetitive bending, lifting, or strenuous physical activity can lead to increased intra-abdominal pressure, potentially causing the perforation of pre-existing non-Meckel's ileal diverticula. These maneuvers may occur in occupations that require frequent heavy lifting, such as construction workers, warehouse employees, or manual laborers. The perforation can result in significant morbidity and may require emergency surgical intervention.

Early diagnosis of Non-Meckel's ileal diverticular perforation is challenging due to its rarity and nonspecific clinical presentation. Patients often present with acute abdominal pain, tenderness, fever, and signs of peritonitis. Imaging studies, such as Computed Tomography (CT) scans, are essential for accurate diagnosis and to assess the extent of perforation and associated complications.

Prompt surgical intervention, usually in the form of segmental small bowel resection with primary anastomosis, is the standard treatment for non-Meckel's ileal diverticular perforation. Delay in diagnosis and treatment can lead to severe complications, such as intra-abdominal abscess formation, sepsis, or intestinal fistulas [3, 4].

This case report highlights the importance of considering non-Meckel's ileal diverticular perforation as a differential diagnosis in patients presenting with acute abdominal pain following occupational maneuvers. Timely recognition, appropriate imaging studies, and prompt surgical intervention are crucial for optimal patient outcomes. Increased awareness of this rare condition among healthcare professionals and occupational health specialists can aid in early diagnosis and prevent potential complications associated with non-Meckel's ileal diverticular perforation.

Case Report

A 22-year-old male presented with a three-day history of diffuse abdominal pain and a two-day history of fever. The patient had no underlying medical conditions. Upon further inquiry, the patient revealed that he had been continuously pressing a power drill against his taut abdomen at his workplace to demolish a wall. The pain was sudden in onset and progressively worsening.

On examination, the patient appeared well-built and moderately nourished. He had a fever and tachycardia. His

oxygen saturation (PaO₂) was 98%, and all other vital parameters, including blood pressure, were within normal limits.

Abdominal examination revealed distension and diffuse guarding, with tenderness in the right iliac fossa. An Abdominal Ultrasound (USG) showed signs of ill-defined heterogeneous thickening in the mesentery. A Computed Tomography (CT) scan revealed a mass-like lesion with fat attenuation involving the small bowel mesentery.

Treatment: After a brief period of evaluation and stabilization with intravenous fluids and antibiotics, the patient underwent emergency laparotomy under general anesthesia. A phlegmonous mass was observed in the mesentery, which was carefully dissected. An ileal diverticular perforation at the mesenteric border, 18 cm proximal to the ileocecal junction, was identified. Adhesions in the ileal segment were also noted. The perforated ileal segment was resected, adhesions were released, and a two-layer anastomosis was performed.

The patient received intravenous fluids, including Piperacillin-Tazobactam, Amikacin and Metronidazole. A nasogastric tube was placed until bowel movements resumed. Histopathological examination revealed a true diverticulum with gastric and pancreatic tissue.

It is important to note that Meckel's diverticulum is typically located on the antimesenteric border, and approximately 50% of diverticula contain ectopic tissue. The most common ectopic tissues found in Meckel's diverticulum are gastric tissue (accounting for 60-85% of cases) and pancreatic tissue (accounting for 5-16% of cases). Other less common tissue types, such as colonic and duodenal tissue, may also be present [11].

Intra Operative Findings

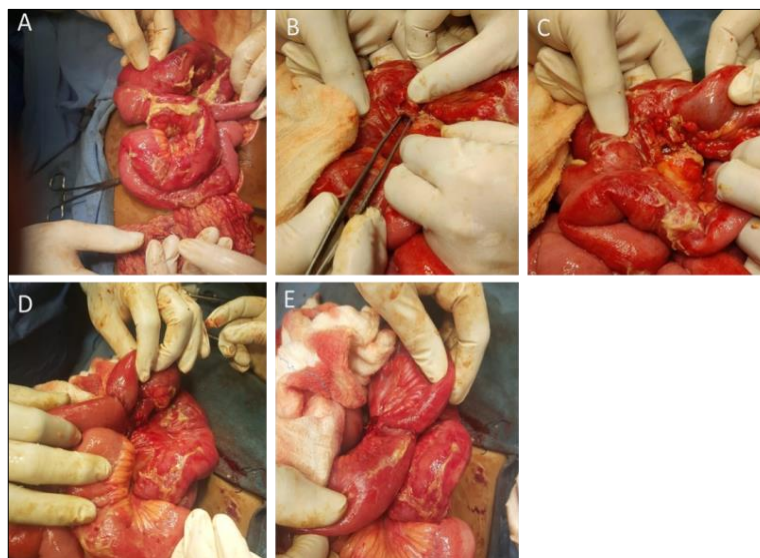


Fig 1: A-Ileal Adhesions, B & C-Ileal Perforation, D & E-Ileoileal end to end Anastomosis

Discussion

Ileal diverticulosis is an uncommon entity, occurring with an incidence of 0.1-1.5% [7]. Ileal diverticula are mostly *false diverticula* when compared with the more common *true* Meckel's diverticulum occurring in the ileum. A false diverticulum involves only the mucosa and does not involve muscularis propria and adventitia. But a true diverticulum like meckel's diverticulum involves all the layers. They are usually multiple and occur at the mesenteric border,

sometimes hidden in the mesentery and overlooked during surgery [8]. The cause for small bowel diverticulosis is likely a motor dysfunction of myenteric plexus or smooth muscle fibers which results in disordered contraction and increased intraluminal pressure and causes herniation along the area where the vasa recta blood vessels and nerves penetrate the mesentery area [5, 6]. Diverticulosis occur after sixth decade of life [9].

Acquired diverticula of the ileum may be a primary condition or secondary due to abdominal surgery, tuberculosis or Crohn's disease. Most patients with ileal diverticulosis are asymptomatic and diagnosis is made on routine imaging studies or at autopsy of the patients who become symptomatic, most present with intermittent mild abdominal discomfort that may localize to the right lower quadrant. Complications include diverticulitis, intestinal obstruction, volvulus, fistula, bleeding or perforation. Because of the similar presentation, ileal diverticulitis can be mistaken for appendicitis [9]. Therefore many cases are taken up for surgery without an accurate preoperative diagnosis. The acute complications of ileal diverticula are rare, occurring in 6.5-10.4% of the cases. The mortality of the associated complications is 25-50% [10]. Ileal diverticulitis and complications are diagnosed with radiological studies. CECT is the initial test of choice demonstrating wall thickening, extra luminal free air, mesenteric inflammation and fluid collection if perforation has occurred. In the case presented here, the CT scan showed mesenteric mass like lesion with fat attenuation involving small bowel mesentery. There was no free air (possibly absorbed) and no ileal diverticula were evident. The appendix was not well visualized.

The management of ileal diverticulitis is similar to that of colonic diverticulitis. It should be treated conservatively whenever possible with bowel rest, IV fluids and IV antibiotics. For those who present with complications such as bleeding, obstruction or perforation, surgical intervention is required as was done for this patient. The procedure involves segmental resection with primary anastomosis [7]. Histopathology in our case showed a true diverticulum with gastric and pancreatic tissue. Meckel's diverticulum is mostly located on the antimesenteric border and about 50% of diverticula contain ectopic tissues, gastric tissue accounts for 60% to 85%. Pancreatic tissue accounts for 5% to 16%, and other less common tissue types include colonic and duodenal [11].

Conclusion

Ileal diverticulitis, although rare, should be included as a differential in all cases of right lower quadrant pain. The index of suspicion should be high when CT findings show an inflammatory process but not suggestive of appendicitis. Our case was unique in more than one way. Occupational hazard of sustained pressure onto abdominal wall had caused the diverticulum to "burst" open. The perforation got sealed, tempting us to go for conservative treatment. Resection and anastomosis was done and biopsy revealed gastric and pancreatic tissue, which is very rare and so far not reported in the literature. Had resection been not done, the patient would continue to have recurrent problems.

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