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Beyond the usual suspects: A dive into rare medical anomalies

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Abstract
Paraduodenal hernias are rare congenital internal hernias resulting from abnormal retroperitoneal fixation and midgut rotation anomalies. Right paraduodenal hernias, comprising only 25% of all paraduodenal hernias, present significant diagnostic challenges due to their rarity and non-specific clinical presentation. We report a case of a 48-year-old male who presented with lower abdominal pain and vomiting over three days. Initial laboratory investigations were normal, and routine imaging was unremarkable. Contrast-enhanced computed tomography revealed right paraduodenal hernia with impending bowel ischemia. The patient underwent successful surgical repair via exploratory laparotomy with reduction of herniated bowel loops and anatomical reconstruction. This case emphasizes the importance of maintaining high clinical suspicion for paraduodenal hernias in patients presenting with recurrent abdominal pain and partial intestinal obstruction. Advanced imaging techniques are crucial for accurate diagnosis, and timely surgical intervention is essential to prevent severe complications.

Keywords: Paraduodenal hernia, waldeyers fossa, intestinal obstruction, internal hernia, midgut malrotation

Introduction

Paraduodenal hernias, also known as mesocolic hernias, represent a rare form of congenital internal hernia accounting for approximately 0.2-0.9% of all hernias and 1-6% of all internal hernias [1]. These anomalies result from developmental abnormalities during embryogenesis, specifically due to abnormal retroperitoneal fixation and anomalous midgut rotation around the superior mesenteric artery.

Paraduodenal hernias are classified anatomically into two distinct types based on their location. Left paraduodenal hernias, which occur through Landzert's fossa, constitute approximately 75% of cases. Right paraduodenal hernias, occurring through Waldeyer's fossa, represent the remaining 25% and are the focus of this case report [2]. The hernia sac in right paraduodenal hernias is typically bounded by the ileocolic, right colic, and middle colic vessels.

The clinical presentation of paraduodenal hernias varies significantly, ranging from asymptomatic cases discovered incidentally during surgical procedures to acute presentations with complete intestinal obstruction. The pathophysiology involves failure of normal rotation around the superior mesenteric artery, resulting in small intestine becoming trapped between the posterolateral peritoneum and the mesenteric vessels.

Potential complications include bowel obstruction, ischemia, and necrosis, with studies indicating a 50% risk of bowel incarceration if left untreated [3]. The rarity of this condition, combined with its non-specific clinical presentation, often leads to delayed diagnosis and increased morbidity.

Case Summary

A 48-year-old male presented to our emergency department with a three-day history of severe, progressive, intermittent lower abdominal pain and five episodes of vomiting containing food particles and non-bilious over the same period. There was no history of trauma, fever, loose stools, or previous abdominal surgeries. The patient had no significant past medical history or family history of gastrointestinal disorders.

On physical examination, vital signs were within normal limits. Abdominal examination revealed uniform distension with mild tenderness localized to the umbilical region. Bowel sounds were present but sluggish. Digital rectal examination demonstrated a collapsed rectum with no fecal staining, suggesting proximal obstruction.

Initial laboratory investigations including complete blood count, comprehensive metabolic panel, and inflammatory markers were within normal limits. Plain abdominal radiography and abdominal ultrasound examination were unremarkable, showing no definitive signs of obstruction or other abnormalities.

Given the clinical presentation and inconclusive initial imaging, contrast-enhanced computed tomography (CT) of the abdomen and pelvis was performed. The CT scan revealed a cluster of dilated small bowel loops positioned to the right of the duodenum, behind the superior mesenteric vessels, consistent with right paraduodenal hernia. Importantly, the imaging suggested impending ischemia of the involved bowel segments, necessitating urgent surgical intervention.

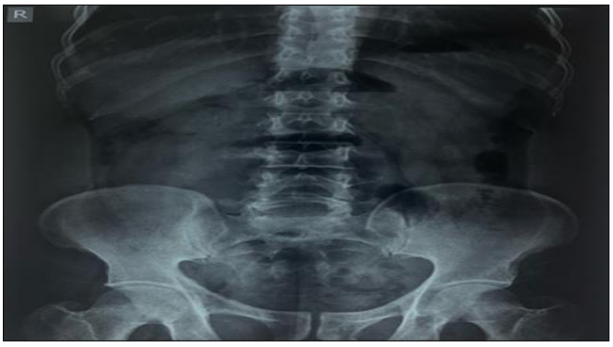

Fig 1: Erect X-ray Abdomen

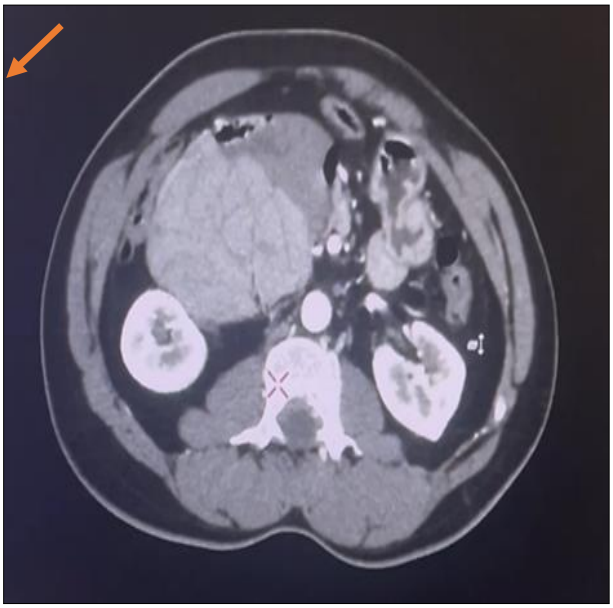

Fig 2: CECT Abdomen - Cross sectional view showing abnormal clustering of dilated small bowel loops positioned to the right side of the abdomen

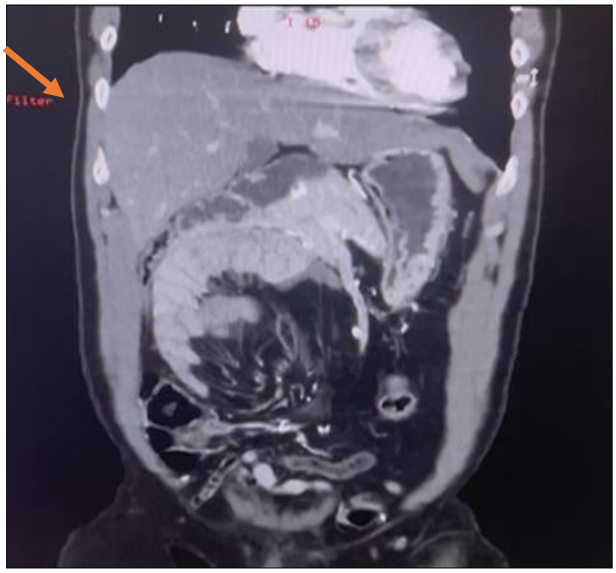

Fig 3: CECT Abdomen – Coronal view

Surgical Intervention

Based on the CT findings and clinical presentation, the patient underwent emergency exploratory laparotomy.

Intraoperative findings confirmed the diagnosis of right paraduodenal hernia with the following anatomical observations:

- Dilated small bowel loops consistent with partial obstruction (Fig.4)
- Herniation of jejunal and proximal ileal loops through Waldeyer's fossa and Collapsed distal jejunal loops (Fig.5)
- Subhepatic positioning of the cecum and appendix, indicating malrotation (Fig.6)
- The hernia defect was bounded anteriomedially by the superior mesenteric artery (SMA) and superior mesenteric vein (SMV), and posteriolaterally by the inferior mesenteric vein (IMV)

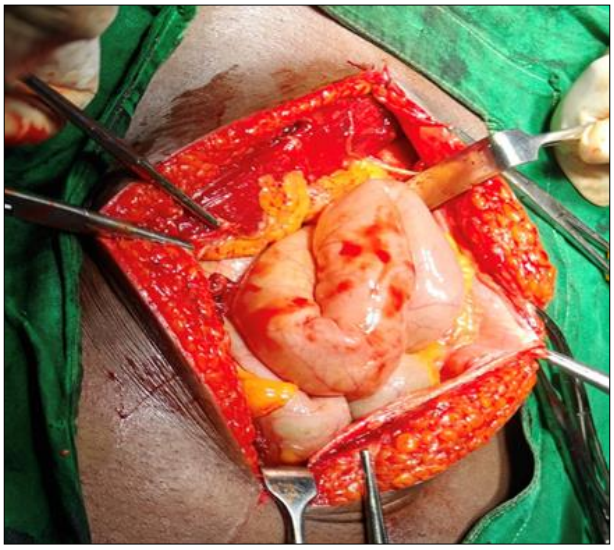

Fig 4: Dilated bowel loops

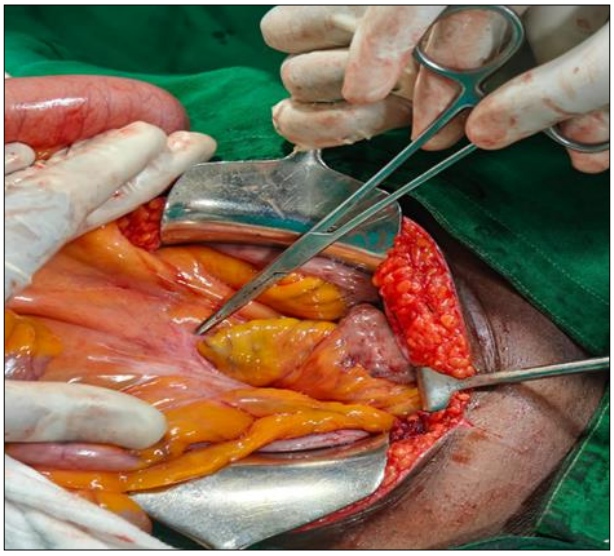

Fig 5: Herniation of jejunal and proximal ileal loops through Waldeyers fossa and distal jejunal loops were collapsed

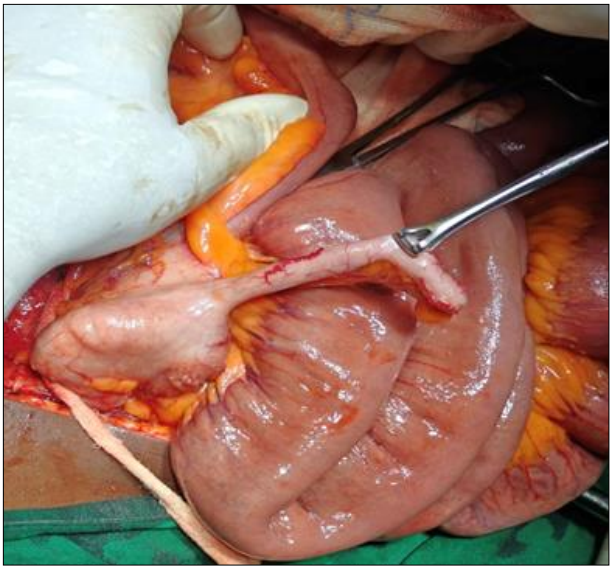

Fig 6: Subhepatic position of the caecum and appendix

The surgical procedure involved careful reduction of the herniated bowel loops. Due to the challenging anatomy with

vital vascular structures bounding the defect, direct closure was not feasible. A Cattell-Braasch maneuver was performed to mobilize the right colon and provide better exposure. Appendectomy was performed prophylactically given the abnormal positioning. The small bowel loops were repositioned to the right side of the abdomen, large bowel loops to the left, and both were secured to the abdominal wall to prevent recurrence.

Postoperative Course

The patient had an uneventful postoperative recovery. Bowel function returned on postoperative day 2, and the patient tolerated oral feeding without complications. He was discharged on postoperative 7 day with no immediate complications.

Discussion

Right paraduodenal hernias represent a rare but clinically significant cause of intestinal obstruction, particularly in middle-aged males during the fourth to sixth decades of life, as demonstrated in our case [4]. The embryological basis of this condition lies in the abnormal development and fixation of the midgut during fetal development. During normal embryonic development, the midgut undergoes a series of rotations around the superior mesenteric artery axis. Failure or incomplete rotation results in abnormal positioning of intestinal segments and creation of potential hernia sites. In right paraduodenal hernias, the defect occurs in the jejunal mesentery at Waldeyer's fossa, creating a potential space for bowel herniation.

The clinical presentation of paraduodenal hernias is often non-specific, which contributes to diagnostic delays. Patients may remain asymptomatic for extended periods, with symptoms developing gradually as bowel loops become increasingly entrapped. Common presentations include recurrent episodes of abdominal pain, nausea, vomiting, and signs of partial intestinal obstruction, as observed in our patient.

Diagnostic imaging plays a crucial role in identifying paraduodenal hernias. While plain radiography and ultrasound may be normal, as in our case, contrast-enhanced CT scanning is the diagnostic modality of choice. The characteristic CT findings include a cluster of small bowel loops positioned abnormally to the right of the duodenum, behind the superior mesenteric vessels, with associated signs of obstruction [2].

The management of paraduodenal hernias is exclusively surgical, and intervention is recommended even in asymptomatic patients due to the high risk of complications. The 50% risk of bowel incarceration if left untreated makes prophylactic repair advisable [3]. Surgical approaches may include laparoscopic or open techniques, depending on the surgeon's expertise and the complexity of the case. The key surgical principles involve careful reduction of herniated bowel loops, assessment of bowel viability, and secure closure or obliteration of the hernia defect. In cases where direct closure is not feasible due to surrounding vital structures, as in our case, alternative techniques such as the Cattell-Braasch maneuver may be employed to achieve adequate repair while preserving vascular integrity.

Conclusion

This case report highlights the diagnostic challenges associated with right paraduodenal hernias and emphasizes the importance of maintaining clinical suspicion in patients presenting with recurrent abdominal pain and signs of partial intestinal obstruction. Advanced imaging techniques, particularly contrast-enhanced CT scanning, are essential for accurate diagnosis and surgical planning.

The rarity of this condition should not diminish awareness among clinicians, as timely recognition and appropriate surgical intervention can prevent severe complications including bowel ischemia, necrosis, and complete obstruction. Proper anatomical knowledge and surgical expertise are crucial for successful management and optimal patient outcomes. Healthcare providers should consider paraduodenal hernias in the differential diagnosis of unexplained abdominal pain, particularly in middle-aged patients with recurrent symptoms. Early diagnosis and prompt surgical intervention remain the cornerstones of successful management, preventing progression to life-threatening complications.

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