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Case Report

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A rare cause of acute abdomen in a child: Left paraduodenal hernia

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Abstract

Paraduodenal hernias are the most common type of internal hernias. Although congenital, they typically present in the fourth or fifth decade of life and are rare in children. A 14-year-old male presented with abdominal pain and vomiting. Computed tomography revealed clustered, dilated small bowel loops in the left upper quadrant, adjacent to the inferior mesenteric vessels. Diagnostic laparoscopy identified a mesenteric defect posterior to the inferior mesenteric vein, through which all intestinal loops from the Treitz ligament to the ileocecal valve herniated. After reducing the herniated loops, the defect was repaired using intracorporeal sutures, and the patient was discharged on postoperative Day 2. At six months of follow-up, his recovery was uneventful. In conclusion, left paraduodenal hernias are rare but may present acutely with obstruction signs. Computed tomography is crucial for diagnosis and surgical planning. Laparoscopy offers advantages such as precise repair and more rapid recovery. Early diagnosis and timely surgical intervention are essential for preventing complications and achieving favorable outcomes.

Keywords: Acute, hernia, ileus, laparoscopy, paraduodenal.

Paraduodenal hernias represent the most common subtype of internal hernias, yet they are a rare cause of intestinal obstruction in the pediatric population.[1] Left paraduodenal hernias originate from mesenteric defects located posterior to the inferior mesenteric vessels due to anomalies in intestinal rotation and fixation during embryological development.[2]

In this report, we present a rare case of left paraduodenal hernia in a child, managed successfully through laparoscopic surgery.

CASE REPORT

A 14-year-old male patient presented to our clinic with complaints of abdominal pain and vomiting. Physical examination revealed tenderness, guarding, and rebound tenderness across the entire abdomen. Based on these findings, an initial diagnosis of acute abdomen was made, and computed tomography (CT) was performed. The CT imaging demonstrated clustered, dilated small bowel loops in the left upper quadrant, adjacent to the inferior mesenteric vessels (Figure 1a). Additionally, the space between the abdominal aorta and the superior mesenteric artery was widened due to herniated bowel loops (Figure 1b).

Diagnostic laparoscopy was performed to confirm the diagnosis. A 5-mm 30-degree camera was inserted through an umbilical port, and three additional 5-mm working ports were placed in the abdominal cavity. Intraoperatively, all small bowel loops from the Treitz ligament to the cecum were found to be confined within a hernial sac located in the left mesocolon, with no free or visible bowel loops in the abdominal cavity (Figure 2a). Upon careful reduction of the

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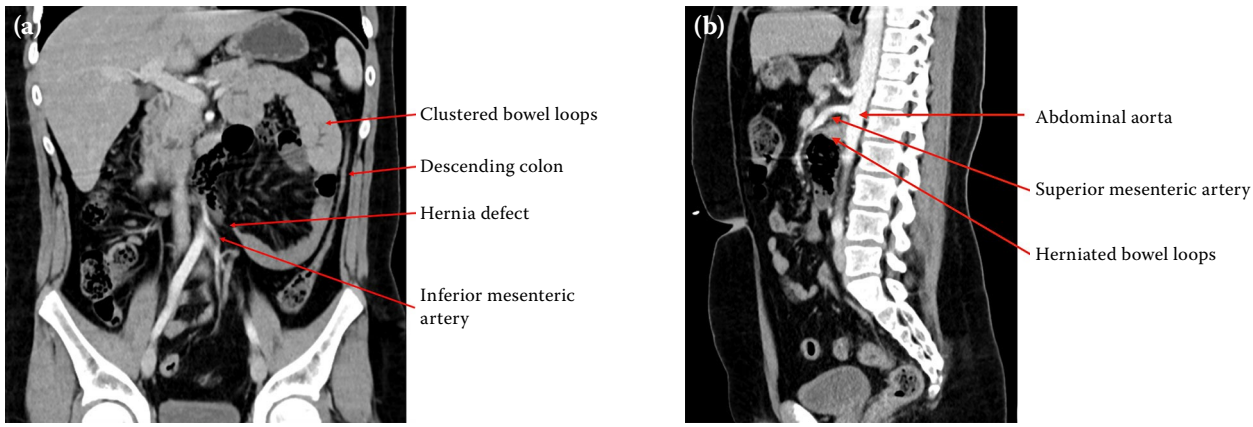

Figure 1. Radiological images. **(a)** Dilated small bowel loops in the left upper quadrant, posterior to inferior mesenteric vessels in the coronal plane. **(b)** Flattened angle between the superior mesenteric artery and abdominal aorta in the sagittal plane.

bowel loops, a paraduodenal mesenteric defect was identified just above the Treitz ligament on the left side of the duodenum, located posterior to the inferior mesenteric vein (Figure 2b). The defect was repaired using intracorporeal sutures, and its edges were secured to the serosa of the duodenum with absorbable sutures to minimize the risk of recurrence (Figure 2c). The patient was discharged on postoperative Day 2. At six months of follow-up, the patient remained asymptomatic without any complications. A written informed consent was obtained from the parents and/or legal guardians of the patient.

DISCUSSION

Internal herniations which can be congenital or acquired result from the herniation of internal organs within the peritoneal cavity. Paraduodenal hernias, the most common type, account for more than 50% of all cases.[1] Paraduodenal hernias develop due to anomalies in rotation or fixation during the antenatal period. They are classified into three main types: left, right, and transverse. Left paraduodenal hernias account for 75% of all cases. In left paraduodenal hernias, the initial rotation of the intestinal loops is normal. However, during the migration of the intestines to the left upper quadrant of the abdominal cavity, the loops invaginate behind the inferior mesenteric vessels into an avascular portion of the left mesocolon.[2] Paraduodenal hernias typically become symptomatic and are diagnosed in the fourth or fifth decade of life. Despite being congenital anomalies, they rarely present with clinical findings in children.[3]

It is challenging to diagnose due to its non-specific symptoms and is often asymptomatic. However, it may present with chronic symptoms such as recurrent abdominal pain, nausea, and vomiting. In acute cases, as seen in our patient, it can manifest with signs of obstruction. The lifetime risk of incarceration has been reported to increase up to 50%. Therefore, even if incidentally detected, surgical correction has been recommended.[4]

Radiological imaging is essential for diagnosis. Contrast-enhanced upper gastrointestinal series may reveal dilated intestinal loops in the upper abdominal quadrants. Of note, CT plays a crucial role in diagnosis and determining anatomical structures. As seen in the presented case, the visualization of the inferior mesenteric vessels and clustered bowel loops in the left upper quadrant are significant findings supporting the diagnosis of a paraduodenal hernia.[5]

The clustering of intestinal loops observed during surgery for paraduodenal hernias and the appearance of the hernial sac may resemble abdominal cocoon syndrome. However, abdominal cocoon syndrome is a rare condition in which the small intestine is encased in a fibrous membrane and develops due to idiopathic or secondary causes. It is

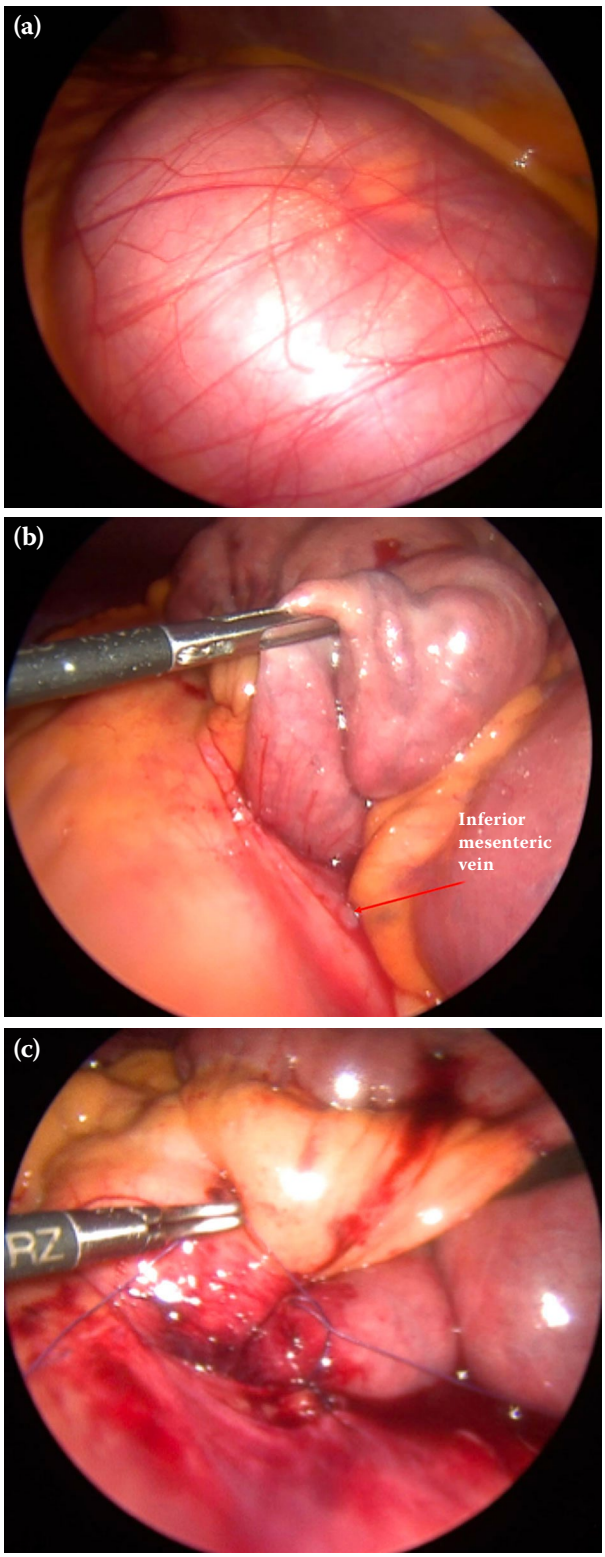

Figure 2. Surgical images. **(a)** Laparoscopic view of herniated bowel loops. **(b)** Hernia defect posterior to inferior mesenteric vein. **(c)** Fixation of the duodenum to the edges of the hernia defect with absorbable sutures.

primarily seen in adults and is often associated with acquired etiologies.[6] Both conditions may present with similar symptoms of intestinal obstruction.[3,7] Therefore, imaging findings play a crucial role in the differential diagnosis.

The fundamental principles of surgical treatment include the reduction of herniated bowel loops, restoration of normal anatomy, repair of the hernial defect, and resection with anastomosis if necrosis is present.[3] During the repair of the defect, it is crucial to preserve structures such as the duodenum and the inferior mesenteric vessels.[8] In cases without malrotation, as in the presented case, reduction of the herniated loops and repair of the defect are recommended. In our case, to minimize the risk of recurrence, the defect was repaired, and the duodenum was fixed to the edges of the hernial defect with serosa-anchored sutures.

The management of paraduodenal hernias accompanied by malrotation remains a subject of debate due to the limited number of reported cases. In one of the most comprehensive series in the literature, Wang et al.[9] categorized right paraduodenal hernias into three distinct groups based on their embryological and anatomical features, and proposed specific surgical techniques tailored to each group.

Laparoscopic surgery offers significant advantages in the management of paraduodenal hernias. The minimally invasive approach allows for better visualization of anatomical structures, reduced postoperative pain, shorter hospital stays, and more rapid recovery compared to open surgery.[4] Additionally, laparoscopy enables precise manipulation and repair of the hernial defect while minimizing trauma to surrounding tissues. In this case, the laparoscopic approach facilitated safe reduction of the herniated bowel loops and efficient closure of the defect, resulting in excellent clinical outcomes.

In conclusion, this case highlights the critical role of radiological imaging and laparoscopic surgery in the diagnosis and management of paraduodenal hernias. Imaging modalities, particularly CT, provide essential anatomical details which guide surgical planning. Laparoscopy, with its minimally invasive nature, not only ensures precise defect repair but also enhances postoperative recovery. Early diagnosis and appropriate

surgical intervention are key to preventing severe complications and ensuring favorable outcomes in patients with paraduodenal hernias.

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