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Left Paraduodenal Hernia in a Young Patient with Recurrent Abdominal Pain: A Case Report and Short Literature Review

Authors' Contribution:

Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

BCDEF 1 **Gabriele Giordano**
BCDEF 2 **Elena La Mirata**
BD 3 **Valentina Politi**
AD 4 **Massimiliano Veroux** 
BD 1 **Gaetano Alfio Meli**
CD 5 **Giuseppe Evola**
ADE 1 **Stefano Palmucci**
AD 1 **Antonio Basile**
ADE 2 **Guido Basile**

1 Department of Medical-Surgical Sciences and Advanced Technologies "G.F. Ingrassia" – Radiology I Unit, University Hospital Policlinico "G. Rodolico-San Marco", Catania, Italy
2 Department of General Surgery and Medical-Surgical Specialties, University of Catania, Catania, Italy
3 UOC MCAU (Urgent Surgery), University Teaching Hospital Policlinico "G. Rodolico-San Marco", University of Catania, Catania, Italy
4 Organ Transplantation Unit, Department of Medical and Surgical Sciences and Advanced Technologies, University Hospital of Catania, Catania, Italy
5 Department of General and Emergency Surgery, Garibaldi Hospital, Catania, Italy

Corresponding Author: Gabriele Giordano, e-mail: gabriele.21.giordano.01@gmail.com

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Patient: Male, 19-year-old
Final Diagnosis: Internal hernia
Symptoms: Abdominal pain • nausea • vomiting
Medication: —
Clinical Procedure: CT scan • laparotomy • magnetic resonance imaging • surgical intervention
Specialty: Radiology • Surgery

Objective: Congenital defects/diseases

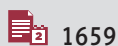
Background: Internal hernias are a rare cause of small bowel obstruction in patients, which usually have a long history of mild abdominal symptoms, sometimes leading to emergency surgery due to acute abdominal pain. Occasionally, it takes a long time to make the correct diagnosis because of symptoms vagueness and transience of typical imaging findings; at times, a definitive diagnosis is possible only through surgery, especially in cases of acute presentations in a low-resource setting where high-performance diagnostic equipment may be unavailable.

Case Report: We report the case of a young male patient with a long history of mild abdominal symptoms and some episodes of acute abdominal pain. Following one of these episodes, several diagnostic examinations were performed and he was diagnosed with left paraduodenal hernia after typical signs were found on imaging exams, both CT and MRI; the patient underwent laparotomy with reduction of intestinal loops in the peritoneal cavity and suturing of the sac and was eventually discharged with no further symptoms whatsoever.

Conclusions: Among internal hernias, left paraduodenal hernias account for the major part and are characterized by the protrusion of bowel loops through the fossa of Landzert; herniated loops produce a sac-like appearance (typical imaging sign on both CT and MRI) and may cause partial displacement of other organs and blood vessels. Internal hernias should always be considered as a rare differential diagnosis in the workup of a patient with abdominal pain or intestinal obstruction: knowledge of both typical imaging features and specific surgical techniques are mandatory so that these patients may be properly cared for.

Keywords: Acute Pain • Hand-Assisted Laparoscopy • Intestinal Obstruction • Magnetic Resonance Imaging • Multidetector Computed Tomography • Paraduodenal Hernia

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Background

Internal hernias are defined as a protrusion of bowel loops through a normal or abnormal orifice in the peritoneum or mesentery; these orifices may be congenital or secondary to some events, such as phlogistic events, traumatic injuries and previous surgery. Moreover, the protrusion may happen: i) through a normal foramen, ii) into an unusual peritoneal recess, or iii) between a defect between peritoneal layers [1].

Internal hernias are a rare but important cause of small intestine obstructions, being responsible for less than 6% of them; however, they represent a rare entity with an overall incidence of less than 1% [2].

If a suspicion of internal hernia arises, radiologists and surgeons need to locate the orifice, as well as recognize landmark vessels, located at the opening of the herniary sac; both features may help to identify the correct type of internal hernia.

The classification for internal hernias has been first proposed by Welch and confirmed by Ghahremani and Meyers. In decreasing order of frequency, nine types have been reported: paraduodenal, pericecal, through the foramen of Winslow,

transmesenteric and transmesocolic, pelvic, intersigmoid, retroanastomotic, and transomental hernias [3].

More than half of internal hernias are represented by paraduodenal hernias [3]; they may be left or right, but in both cases the hernial orifice is embodied by a congenital paraduodenal fossa. Right paraduodenal hernias represent 25% of all paraduodenal hernias and are characterized by protrusion through the fossa of Waldeyer. Left paraduodenal hernias (LPDH) account for the remaining major part, thus being the most common type of internal hernia whatsoever; in this case, the foramen is represented by the fossa of Landzert [1].

Paraduodenal hernias are most commonly found incidentally during laparotomic surgery executed for other reasons or during imaging examinations [4].

Case Report

We report a case of a 19-year-old male who exhibited, over 6 months, multiple episodes of acute transient abdominal pain localized in left abdominal quadrants with nausea and vomiting.

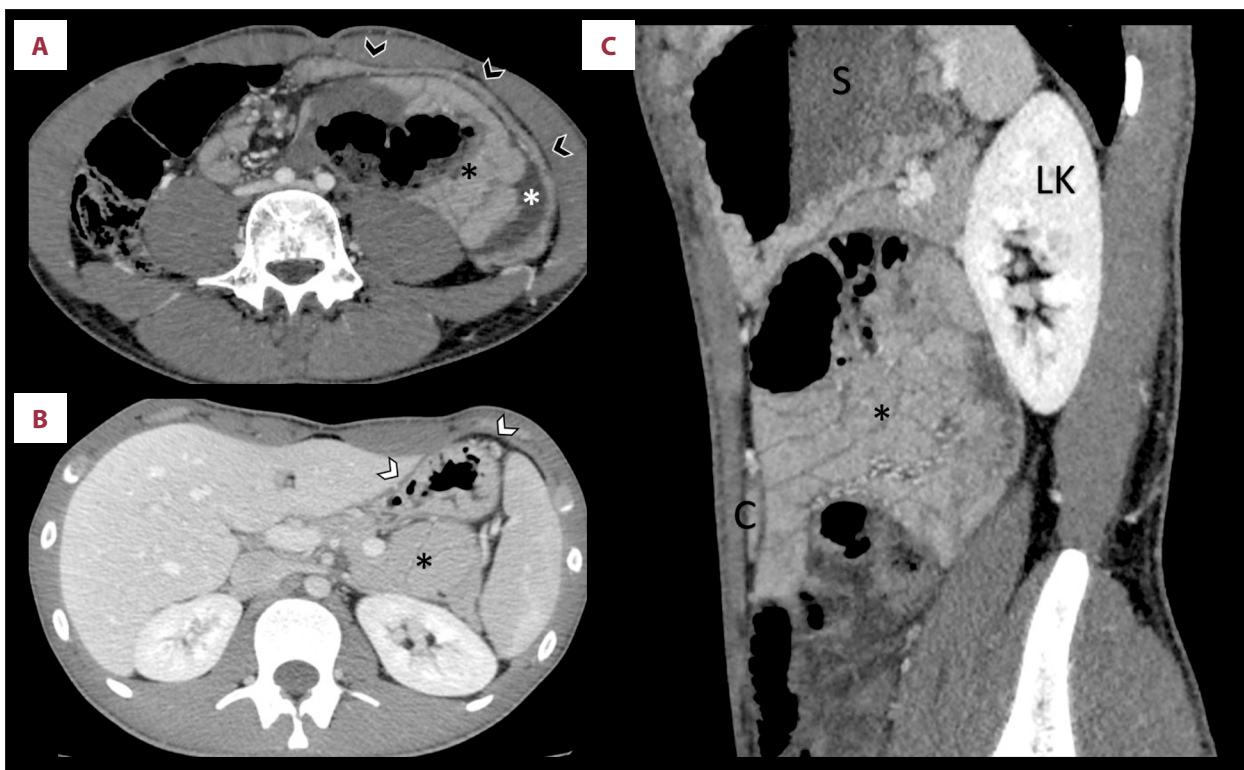


Figure 1. Axial CT contrast-enhanced (A, B) and sagittal CT contrast-enhanced (C) images show the presence of the herniated bowel loops with a sac-like appearance (black asterisk); fluid peritoneal collection can be found nearby (white asterisk). The herniated bowel loops cause partial dislocation of the transverse colon (black arrowheads) and of the stomach (white arrowheads). S – stomach; LK – Left kidney; C – transverse colon.

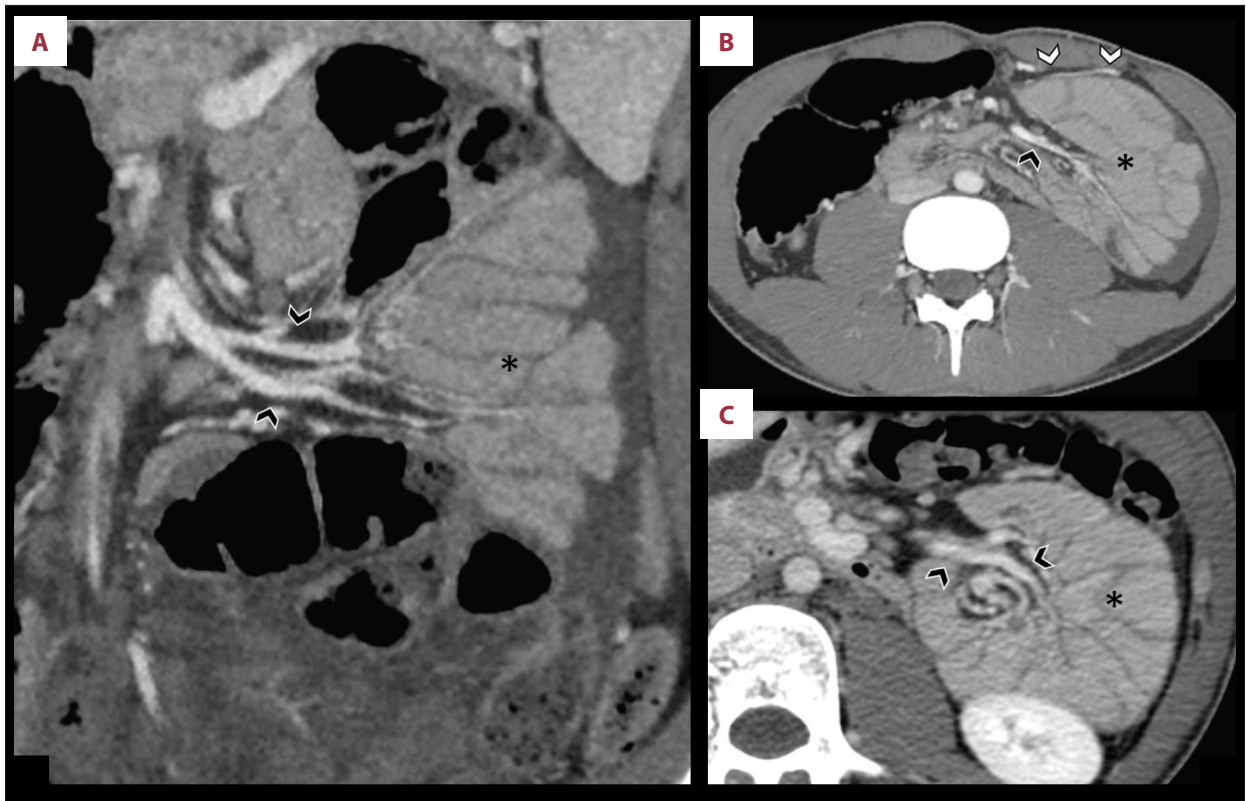


Figure 2. Oblique coronal CT contrast-enhanced (A), axial CT contrast-enhanced (B), and particular of axial CT contrast-enhanced (C) images show the vascular involvement due to the left paraduodenal hernia: mesenteric vessels supplying the herniated loops (black asterisk) are stretched and engorged (black arrowheads), while the inferior mesenteric vein (white arrowheads) is typically found anteriorly to the herniated loops.

Because of his symptoms, a clinical suspicion of inflammatory bowel disease or celiac disease (for which he had family history) was proposed. Therefore, we performed endoscopic examination with ileal and colic biopsies that revealed a reactive follicular hyperplasia and excluded the typical histological features of an inflammatory bowel disease; other tests, like fecal calprotectin and celiac disease-related antibodies serologic test, had negative results.

The young patient came to our attention following a paroxysmal abdominal pain episode. He had no previous significant past medical or surgical history, except for an episode of tibial fracture. He also denied any history of weight loss or recent changes in his bowel habit.

On clinical examination, the patient complained of moderate abdominal pain, with normal vital signs. The clinical inspection revealed abdominal distension with a tender mass in the left upper quadrant. Laboratory exams only showed moderate leukocytosis (WBC $12.75 \times 10^9/l$, C-reactive protein 0.49 mg/l).

An urgent abdominal contrast-enhanced CT scan showed the presence of a cluster of bowel loops with a sac-like appearance

in the left upper abdominal quadrant, posterolaterally to the inferior mesenteric vein, which appeared stretched, while mesenteric vessels supplying herniated loops appeared engorged; this bowel loops cluster displaced the transverse colon inferiorly and descending colon inferolaterally. In addition, mesentery fat was mildly hyperdense with some visible enlarged nodes; a small quantity of peritoneal effusion was detected as well (Figures 1, 2).

During hospitalization, he underwent capsular endoscopy with no signs of inflammatory disease located in the duodenum, jejunum, or ileus.

In addition, MRI enterography was performed to exclude the presence of an inflammatory bowel disease. The cluster of bowel loops in the left upper abdominal quadrant was confirmed, and there was no sign of an inflammatory process involving the small bowel, as well as no edematous thickening of the intestinal wall (Figure 3).

Gastroenterological and vascular surgical consultations excluded a clinical picture of chronic intestinal disease or vascular emergencies.

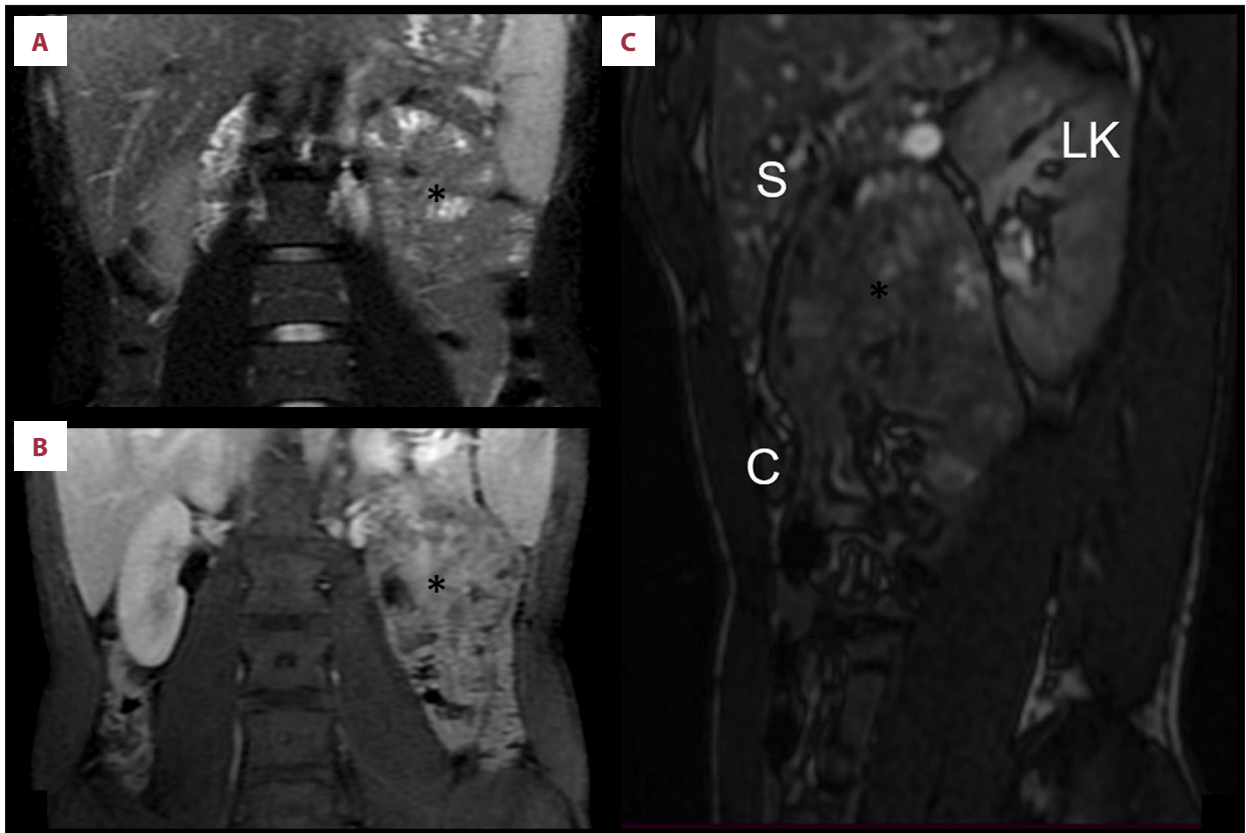


Figure 3. Coronal T2-W (A), coronal fat-saturated contrast-enhanced T1-W (B) and sagittal FIESTA (C) images confirmed the presence of the herniated bowel loops (black asterisk), which show no sign of edematous thickening of intestinal wall. S – stomach; LK – left kidney; C – transverse colon.

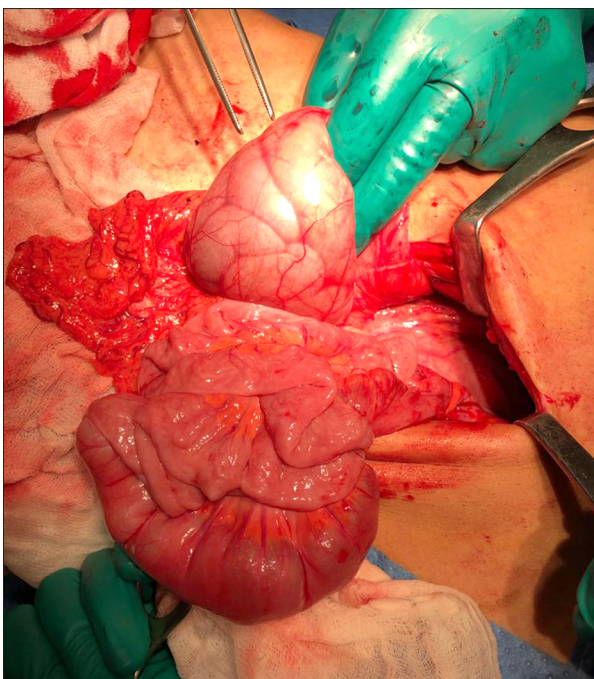


Figure 4. Jejunal loops presenting with a sac-like appearance after median laparotomy.

Due to the persistence of symptoms, the patient underwent laparotomy; the hernial sac was identified, the loops were reduced in the abdomen, and the hernial sac sutured with a continuous suture and resected at the base (Figures 4, 5).

One day after discharge, the patient returned to our hospital due to vomiting and abdominal pain; we performed another contrast-enhanced CT scan, which found an obstructive pattern involving the small intestine with the tight narrowing of jejunal loops lumen near the site of recent surgery, and the duodenum and proximal jejunum were dilated.

The patient underwent another laparotomy, during which an adhesion was found, probably related to the first surgical operation, causing intestinal obstruction, without any recurrence of the paraduodenal hernia. The adhesion was then easily released; after surgery, peristalsis resumed promptly and the patient was discharged in good general condition.

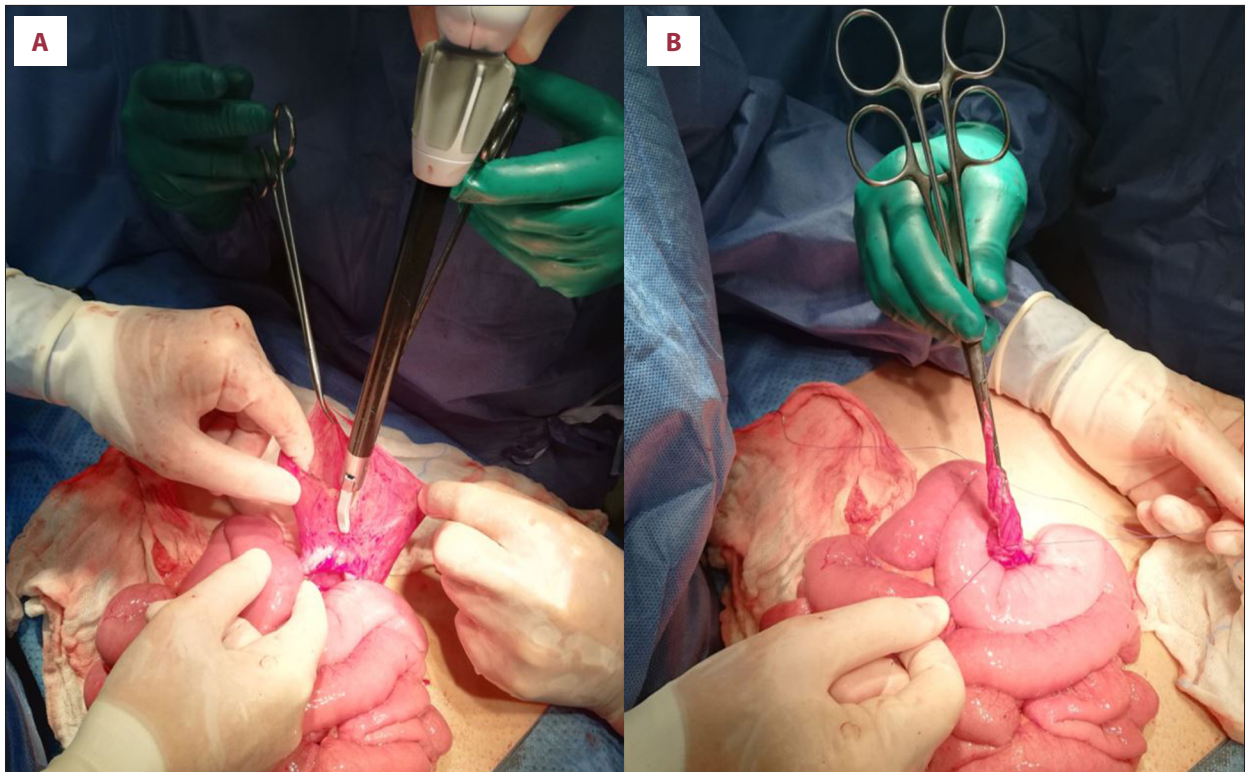


Figure 5. (A) Opening and resection of the herniary bag via Enseal (Ethicon). (B) Binding of the herniary bag containing the loops at the base.

Discussion

The fossa of Landzert is an unusual peritoneal recess that can be found to the left of the ligament of Treitz, at the duodenojejunal junction, posterior to the inferior mesenteric vein and left branches of the middle colic artery. In this anatomical region, there is the confluence of descending mesocolon, transverse mesocolon, and small bowel mesentery. Sometimes, the descending mesocolon fails to fuse with the posterior parietal peritoneum; this is probably due to the inferior mesenteric vein (IMV), which occasionally lifts a peritoneal fold along its course laterally and superiorly to the fossa of Landzert [1,3,5,6].

Left PDH may be asymptomatic; clinical symptoms of internal hernias depend on the degree of bowel protrusion and vascular involvement. Patients may present with mild chronic or intermittent abdominal pain, history of digestive disorders since childhood, nausea and vomiting, up to episodes of recurrent intestinal obstruction and bowel ischemic events. Furthermore, herniated loops oppose stomach dilatation, causing postprandial discomfort and pain, which are typical in these patients and may be eased by postural changes [1-3,6]. Non-specific symptoms are sometimes attributed to biliary disease, gastritis, and gastroesophageal reflux, requiring laparoscopic cholecystectomy or fundoplication. Moreover, the laboratory investigations may be inconclusive [7].

Bowel loops can be found on CT scans, with a “sac-like” appearance, lying in the left anterior pararenal space, between the pancreas tail and the posterior wall of the stomach, to the left of the fourth duodenal portion. Because of the mass effect caused by crowding of bowel loops, there may be displacement of organs, mainly of the stomach (anteriorly), the duodenojejunal junction (inferiorly and medially), and the transverse colon (inferiorly). The bowel needs to be examined throughout its length on imaging exams, especially CT, thanks to its high spatial resolution, to avoid missing small internal hernias and performing unnecessary surgical treatments.

A closed-loop obstruction may be identified as a dilated C-shaped loop, whose lumen is filled with fluids. Landmark vessels can be identified at the hernial orifice, appearing stretched and engorged; this can be a dangerous, even life-threatening, condition that can lead to ischemic events. Landmark vessels for LPDHs are the inferior mesenteric vein and the left colic artery, whose location is typically antero-medial to the “sac-like” appearance of the herniated bowel loops [1,3,5].

CT scans are usually the imaging method of choice; sometimes, the suspicion of inflammatory bowel disease arises, in which case, MRI examinations (with magnetic resonance enterography) may prove useful in differential diagnosis. LPDH imaging features on MRI are similar to those on CT scans, but MRI

can additionally show edematous thickening of bowel walls, which may be a sign of strangulation [8,9].

Diagnostic delays increase surgical complications, such as bowel obstruction, gangrene, and perforation. Once a LPDH is confirmed, surgical treatment is mandatory, given that there is a 20-50% mortality rate for acute presentations [10,11].

Traditionally, left PDHs have been repaired through open surgery; laparoscopic approaches have been described as well, the first one performed by Uematsu et al in 1998 [12].

Laparotomic and laparoscopic approaches, in cases without any complications, consist of reduction of the herniated bowel through herniary orifice, which should be closed with non-absorbable sutures or a mesh [13,14]. If any complications are found, it is more prudent to perform laparotomy. In our case, an open surgical approach was chosen because complications were suspected – stretching of mesenteric vessels and small peritoneal fluid collections were found on imaging – and because the surgical team was not completely confident with employing advanced laparoscopic techniques in this situation.

In cases associated with intestinal ischemia, resection of the ischemic intestinal segment may be necessary, according to international guidelines. However, extensive resection can lead to complications for the patients; in low-resource settings, a clear diagnosis may be possible only on the operating table and techniques such as temporizing surgery may be needed to reduce the extent of ischemic bowel and the necessary resection [15,16].

Knowledge of locoregional anatomy is fundamental to obtain surgical success; the inferior edge of the anomalous peritoneal

recess is free of vital structures, so it can be easily widened to facilitate bowel reduction. If this goal is accomplished without any intra-operative complications, no further steps are needed before closure of the defect. It is worth noting that suture type choice can affect the overall risk of recurrence [7].

Conclusions

Left PDH, although a rare condition, it must be considered in young patients with a history of recurrent abdominal pain episodes without any previous surgical interventions or inflammatory diseases diagnosis.

The criterion standard examination used to assess the presence of a LPDH is contrast-enhanced CT, if available; in cases of an acute presentation in settings without a CT scan, diagnosis may be possible only through surgery. Early diagnosis allows the reduction of bowel protrusion and closure of the peritoneal defect through less invasive surgical approaches; if any complications are detected at the time of diagnosis, a more radical intervention may be needed, such as partial bowel resection. The laparoscopic approach, which can be challenging in the presence of an SBO, is recommended, whenever feasible, due to the reduced postoperative morbidity, shorter hospital stay, and enhanced recovery.

Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

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