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Laparoscopic treatment of acute small bowel obstruction due to left paraduodenal hernia: A case report and literature review



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ABSTRACT

INTRODUCTION: Internal hernia is a pathological condition resulting from abnormal protrusion of abdominal viscera through an opening in the intraperitoneal recesses of the abdominal cavity. Small bowel obstruction due to internal hernia is not common (0.25–0.9% of cases). The most common group is that of paraduodenal hernias (53%), of which the left-sided one is the most common type (75%).

PRESENTATION OF CASE: We report a case of a 43 year-old man with a history of recurrent abdominal pain, who was hospitalized because of an episode of acute small bowel obstruction. He had no previous surgery. Computed tomography revealed an encapsulated circumscribed cluster of jejunal loops in the left upper quadrant, near the ligament of Treitz, and the hernia orifice was adjacent to the left side of the inferior mesenteric vessels. Emergency laparoscopic surgery was performed: the small bowel was found completely herniated under the inferior mesenteric vessels. It was gradually reduced and the hernia space was closed with a running suture. The patient was discharged on the fourth day without complications.

CONCLUSION: Left paraduodenal hernia is a rare cause of small bowel obstruction that should be taken into account in a patient with a history of recurrent abdominal pain or intestinal obstruction, and no previous surgery. Computed tomography is the standard for a correct diagnosis. Surgery is treatment of choice, because it reduces the risk of emergency and complications associated to hernia. Laparoscopic approach is feasible and effective, also in emergency situation.

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1. Introduction

Internal hernia is a pathological condition resulting from abnormal protrusion of one or more abdominal viscera (most frequently small bowel or omentum, but sometimes also colon or stomach) through an opening in the natural or newly formed intraperitoneal recesses of the abdominal cavity. Small bowel obstruction due to internal hernia is not common, 0.25–0.9% of cases approximately [1–4]. The most common group is that of paraduodenal hernias (53%), of which we have two types: the left-sided one which is the most common type (75%) and the right-sided one, which is less frequent (25%). These hernias are the result of herniation of small bowel loops through the paraduodenal fossa and must be taken into account in case of patients with no history of previous surgery and a clinical picture of small bowel obstruction [2].

This paper introduces the case of a patient with small bowel obstruction due to left paraduodenal hernia, which was success-

fully treated by laparoscopic approach and a review of the current scientific literature [1–24] concerning the increasingly emerging minimally invasive treatment of this surgical emergency.

2. Presentation of case

We present the case of a 43 year-old man with a history of acute recurrent mesogastric and hypogastric pain, who was hospitalized because of a further episode of acute abdominal pain associated to at least 2 days of nausea and vomiting. Physical examination showed abdominal distension, mild mesogastric and hypogastric tenderness without peritoneal signs. He had no personal history of noteworthy medical and surgical diseases, nor previous surgery, hemostasis disorders or spontaneous bleeding.

Laboratory test results performed upon hospital admission were normal. An abdominal computed tomography (CT) revealed an encapsulated circumscribed cluster of jejunal loops in the left upper quadrant. The proximal side of the cluster was shown to be the jejunum near the ligament of Treitz, and the hernia orifice was adjacent to the left side of the inferior mesenteric vessels. The endogenous contrast medium showed the so called “perfusion cut-off sign” that define a midgut volvulus. No dilatation of the jejunum was observed (Figs. 1 and 2).

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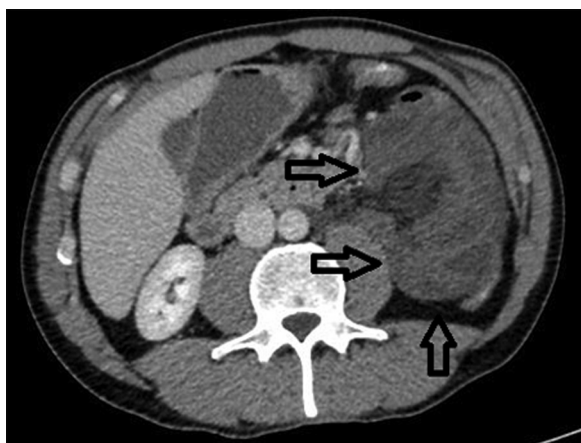


Fig. 1. Abdomen CT scan shows a “cluster” of jejunal loops in the left upper abdomen (black arrows).

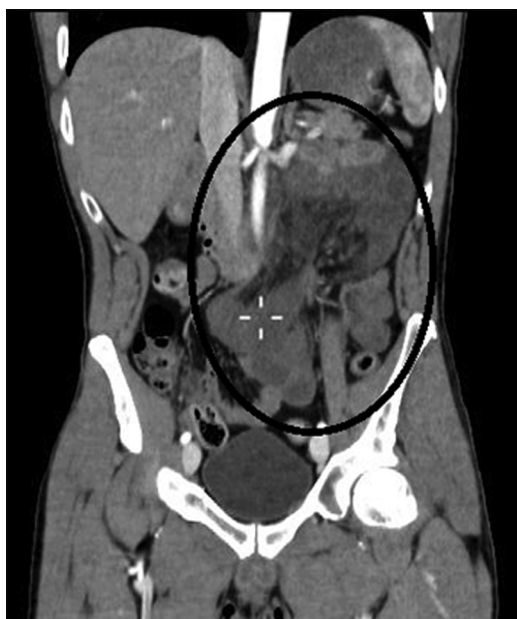


Fig. 2. Axial abdomen CT scan shows a “cluster” of jejunal loops in the Landzert's fossa (black circle).

Emergency laparoscopic surgery was performed to treat the internal hernia (Video 1). With the surgeon and the camera assistant to the right of the patient, laparoscopy was performed using three trocars: one 12-mm camera trocar in the right lumbar region, one 5-mm trocar in the right hypochondriac region and one 12-mm trocar in the right iliac fossa. During laparoscopy, the small bowel was found completely herniated under the inferior mesenteric vessels (Fig. 3). After the adhesiolysis, the jejunum entrapped in the hernia was gradually reduced and examined, without the detection of ischemic injuries. There was no apparent abnormality of the transverse or descending colon, nor visible and isolable hernia sac. Then, the hernia space (Landzert's fossa) was simply closed with a running barbed 3–0 V-Loc™ suture between the neck of the sac and the first jejunal loops (Fig. 4). No abdominal drain was placed.

The patient started to eat on the first postoperative day and was discharged on the fourth day without any complications.

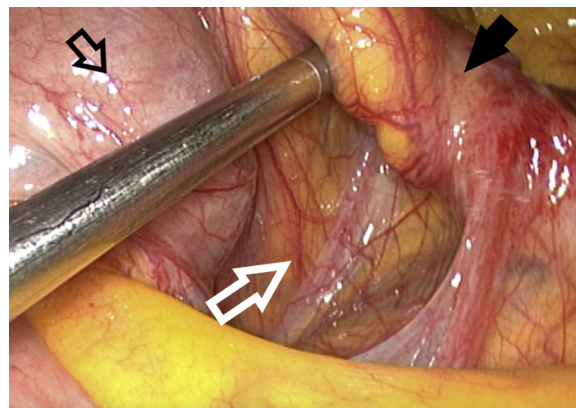


Fig. 3. Laparoscopic view of the hernia orifice. This intraoperative image shows the Landzert's fossa (empty white arrow), bounded by the first jejunal loop to the left (empty black arrow), the neck of the sac up and to the right (solid black arrow) and the mesentery below.

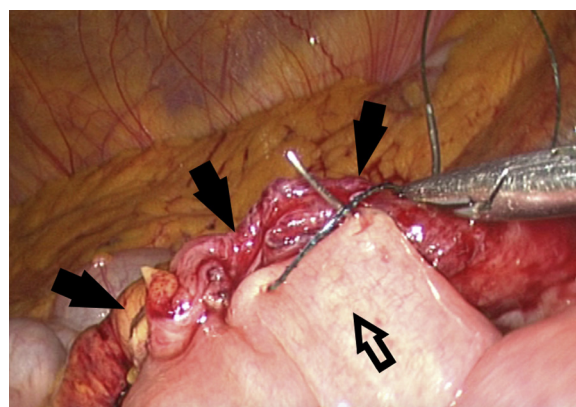


Fig. 4. Laparoscopic view of 3–0 V-Loc™ intracorporeal continuous suture. This intraoperative image shows the closing of hernia orifice using continuous suture of the neck of the sac (solid black arrows) and the first jejunal loops (empty black arrow).

3. Discussion

Paraduodenal hernia, also called congenital mesocolic hernia, congenital mesenterico-parietal hernia or retroperitoneal hernia represents a congenital malformation that alone accounts for approximately 30–53% of all internal hernias [3]. Usually, males are more affected than females (3:1) and the fourth–sixth decade of life turns out to be the most involved [2,4]. There are many theories about the origin of paraduodenal hernias, but the most widely accepted one is that they are the result of an embryological error that occurs during the process of rotation and bowel fixation leading to entrapment of the small bowel between the mesocolon and the posterior abdominal wall [1,2,4,25]. Right and left paraduodenal hernias are separate entities, which differ in anatomical location and embryological origin. Left paraduodenal hernias are congenital anomalies that arise during the rotation of the digestive tract, when the small bowel invaginates in an avascular segment of transverse-descending mesocolon, localizing into a fossa (Landzert's fossa) to the left of the fourth part of the duodenum, posterior to the inferior mesenteric vein and to left branches of the middle colic artery (Fig. 5) [1,2,4,12,25]. At autopsy, the Landzert's fossa was found in about 2% of the population [10,12,25]. A left paraduodenal hernia usually contains the majority of the small bowel, from the fourth part of the duodenum to the terminal ileum, while the colon usually lies in its anatomically correct position. Only infrequently can the descending colon be found to the right of the hernia [25]. In

Table 1

Patient characteristics from the reports of laparoscopic treatment of left paraduodenal hernia.

Authors/year	Age	Gender	Emergency or elective surgery	Type of laparoscopic repair	Suture material	Diet	Length of stay	Complications
Current report	42 yo	Male	Emergency	Intracorporeal continuous suture	3-0 V-Loc™	1	4	None
Sherman et al./2015 [23]	26 yo	Male	NA	Intracorporeal continuous suture	NA	1	1	None
Winder et al./2015 [20]	34 yo	Male	Elective	Intracorporeal interrupted suture	NA Silk	1	1	None
Lim et al./2015 [19]	47 yo	Female	Emergency	NA	NA	1	1	None
Assenza et al./2014 [2]	67 yo	Male	Emergency	NA	NA	2	4	None
Lee et al./2014 [18]	74 yo	Female	Emergency	Intracorporeal interrupted suture	3-0 Vicryl™	NA	4	None
Force et al./2013 [22]	25 yo	Female	Emergency	Intracorporeal interrupted suture	2-0 Silk	1	1	None
Siddika et al./2013 [17]	35 yo	Male	Elective	Intracorporeal continuous suture	NA	1	1	None
Milani et al./2013 [24]	45 yo	Male	Emergency	Intracorporeal interrupted suture	NA	NA	10	None
Hussein et al./2012 [16]	59 yo	Female	Emergency	Intracorporeal continuous suture	2-0 Prolene®	1	3	None
Nam et al./2012 [15]	12 yo	Female	Elective	Intracorporeal interrupted suture	NA	1	5	None
	3 mo	Male	Elective	Intracorporeal interrupted suture	NA	1	4	None
Bernshteyn et al./2011 [21]	39 yo	Male	Emergency	None	NA	NA	2	None
Al-Mufarrej et al./2011 [14]	42 yo	Male	Elective	NA	NA	NA	NA	NA
Parmar et al./2010 [13]	38 yo	Male	Elective	Opening/resection of the sac	None	1	3	None
Khalailah et al./2010 [12]	53 yo	Female	Emergency	Intracorporeal continuous suture	3-0 Silk	NA	3	None
Uchiyama et al./2009 [3]	80 yo	Female	Elective	Hernia defect widened	None	NA	7	None
Poultides et al./2009 [11]	67 yo	Female	Emergency	NA	NA	NA	NA	NA
Jeong et al./2008 [10]	52 yo	Male	Emergency	Intracorporeal interrupted suture	NA (absorbable)	2	5	None
	58 yo	Female	Emergency	Intracorporeal interrupted suture	NA (absorbable)	3	5	None
Palanivelu et al./2008 [4]	NA	Male	Elective	Intracorporeal interrupted suture	2-0 Vicryl™	3	5	IMV injury
	NA	Male	Emergency	Intracorporeal interrupted suture	2-0 Vicryl™	1	2	None
	NA	Female	Elective	Intracorporeal interrupted suture	2-0 Vicryl™	1	1	Recurrence
Shoji et al./2007 [9]	60 yo	Male	Elective	Intracorporeal NA suture	NA (absorbable)	NA	NA	None
Moon et al./2006 [1]	18 yo	Male	Emergency	Intracorporeal interrupted suture	3-0 Silk	1	1	None
Fukunaga et al./2004 [8]	51 yo	Male	Elective	Intracorporeal continuous suture	NA	1	7	None
Rollins et al./2004 [7]	21 yo	Male	Elective	Intracorporeal NA suture	NA (nonabsorbable)	NA	2	None
Finck et al./2000 [6]	NA	NA	NA	NA	NA	NA	NA	NA
Uematsu et al./1998 [5]	44 yo	Male	Elective	Intracorporeal interrupted suture	NA	NA	8	None

NA—not available, yo—years old, mo—months, IMV—inferior mesenteric vein.



Fig. 5. Illustration of the left paraduodenal hernia anatomy. Small bowel loops are herniated through Landzert's fossa (curved arrow), to the left of the fourth part of the duodenum, posterior to the inferior mesenteric vein and to left branches of the middle colic artery (linear arrow).

the right paraduodenal hernia the small bowel herniates through a defect in the first part of the jejunal mesentery in the so called Waldeyer's fossa [2,25]. At autopsy, the Waldeyer's fossa was found in about 1% of the population [12,25].

The clinical presentation is extremely diversified: they can be completely asymptomatic throughout life, or present with recurrent upper abdominal pain (43%) or with symptoms and signs of small bowel obstruction. Only in a third of cases, can left paraduodenal hernia lead to the appearance of a palpable abdominal mass in the left upper quadrant and a relaxation of the eccentric ileal loops at the headquarters of the same [2]. In the majority of cases, laboratory tests are non-specific but they may be useful in case of biochemical changes related to small bowel obstruction.

Abdominal X-ray can give information about the bowel tract involved and the level of small bowel obstruction. Abdominal CT scan is the standard for the diagnosis of the left paraduodenal hernia. It may show different typical radiological aspects related to hernia: a "cluster" of small bowel loops, an encapsulated saclike mass at level of the ligament of Treitz, a depression of the duodenal-jejunal junction, a mass effect on the rear wall of the stomach, congestion and overcrowding of the mesenteric vessels with frequent right displacement of the main mesenteric trunk, and anterior upwards displacement of the inferior mesenteric vein, which delimits the hernial defect and a depression of the transverse colon [2,3,9,10,12,18].

In absence of a significant radiology image, it is difficult to make a diagnosis of left paraduodenal hernia relying only on clinical and laboratory information, but a suspicion must be raised in the case of a young or adult person with symptoms and signs of small bowel obstruction, no history of inflammatory bowel disease, or external hernias or previous laparotomy [2,25].

Surgical treatment is the only possible solution and it turns out to be mandatory because of the increased risk for a life-long incarcerated or strangulated hernia, which represent acute complications related to a 20–50% mortality rate [2]. Surgery essentially provides for the reduction of hernial contents and the closure of hernial defect. In some cases, sac removal was suggested, although in agreement with other authors, we do not suggest this procedure, being it an integral part of the mesocolon and because of the high potential to cause injuries to the colic vessels.

We performed a literature search to identify the rare cases of left paraduodenal hernia treated with laparoscopic approach. Between January 1998, in which Uematsu et al. [5] first described the mini-

mally invasive treatment of this surgical emergency, and November 2015 were published only 28 case reports, excluding the our case. Analyzing data in previous report cases are deduced several advantages: a decrease of post-operative pain, reduced morbidity, early food resumption (1.33 average, range 1–3), shorter hospital stay (3.60 average, range 1–10). These benefits occurred regardless of: type of intervention (elective or emergency), type of repair (closure of hernial defect with continuous or interrupted suture, enlargement of defect or resection of the sac) and type of material used (adsorbable or not adsorbable, monofilament or polyfilament). Only a few complications were described: a case of inferior mesenteric vein injury and a recurrence repaired with GoreTex mesh. In our case, we opted for the laparoscopic approach too, in emergency, experiencing the same benefits as those described by other authors [1–24] (Table 1).

Therefore, on the basis of our experience and of current literature, we believe that, in a health center which has a strong experience of advanced laparoscopic surgery, if we are faced with a patient who is suffering from left paraduodenal hernia—with or without small bowel obstruction—and is hemodynamically stable, a laparoscopic approach is proper in order to enjoy the above described benefits. If we should identify intraoperative highly dilated ileal loops or an ischemia, we would always have enough time for a possible conversion to laparotomy.

4. Conclusion

Left paraduodenal hernia is a rare cause of small bowel obstruction that should be taken into account in the case of a patient with a history of recurrent abdominal pain or intestinal obstruction, and no previous surgery. CT is the standard for a correct diagnosis. As it happened in our case, an early diagnosis can reduce the risk of acute complications such as obstruction, necrosis and perforation.

Surgery is treatment of choice, even in asymptomatic cases, because it reduces the risk of emergency and complications associated to hernia, which develop in almost half the cases. Laparoscopic approach by expert hands is feasible and effective, also in emergency situation.

Conflict of interest

None.

Funding

None.

Ethical approval

None.

Contributors

Zizzo: study design, data collection, statistical analysis, data interpretation, manuscript preparation, literature search, writing.

Smerieri: data collection, data interpretation, manuscript preparation, writing.

Barbieri: data collection, manuscript preparation.

Lanaia: study design.

Bonilauri: study design.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Guarantor

Dr. Stefano Bonilauri, Chief of C.S. General and Emergency Surgery, Azienda Ospedaliera–IRCCS Arcispedale Santa Maria Nuova, Avenue Risorgimento 80, Reggio Emilia 42123, Italy.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.ijscr.2016.01.012>.

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