CAHIERS MAGELLANES-NS
Volume 06 Issue 2
2024

ISSN:1624-1940
http://magellanes.com/

A RARE CAUSE OF ACUTE ABDOMEN IN YOUNG FEMALE – OBSTRUCTED LEFT PARADUODENAL HERNIA

Aaradhana Premkumar[1], P.B.Sudarshan[2*],V.Shruthi Kamal[3], Sundaravadanan B. S[4], Shanthini V[5]

[1]Post Graduate, Department of General Surgery, Saveetha Institute of Medical and Technical Sciences (SIMATS), Email: aaradhana.1996@gmail.com,Telephone-

[2*]Professor of Surgery, Department of General Surgery, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Email: pbsudarshan@yahoo.co.in,Telephone-

[3]Emeritus Professor of Surgery, Department of General Surgery, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Email:shruthivenkataraman9@gmail.com,Telephone

[4]Professor of Surgery, Department of General Surgery, Saveetha Medical College and Hospital, SIMATS, Email: surgeonsundar@gmail.com,

[5]Senior Resident of Surgery, Department of General Surgery, Saveetha Medical College and Hospital, SIMATS, Email: shanuvaithi@gmail.com,

***Corresponding author**: P.B.Sudarshan
*Professor of Surgery, Department of General Surgery, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Email: pbsudarshan@yahoo.co.in,Telephone

Keywords: left paraduodenal hernia, paraduodenal hernia, internal hernia, mesocolic hernia, right paraduodenal hernia, laparotomy, fossa of Landzert, small bowel obstruction, malrotation, fossa of Waldeyer, inferior mesenteric vein (IMV), midgut rotation, superior mesenteric artery (SMA)

INTRODUCTION:

Internal hernia is protrusion of viscera, largely small bowel through a peritoneal or mesenteric aperture (although not all internal hernias are strictly intraperitoneal).In general, interior hernias may be acquired or else congenital. After surgery or trauma, aberrant mesenteric flaws are created, which leads to acquired internal hernias. Inadequate closure (or dehiscence) of mesenteric defects caused by gastrojejunostomy, liver transplant, colostomy, ileostomy, or colon resection is typically the cause of these. For instance, the defect is typically closed because hernia rates following laparoscopic RYGB (Roux-en-Y gastric bypass) have been described to be as high as 9%. Normal foramen, failure of peritoneal fusion, and unusual peritoneal orifices account for the congenital internal hernias.

Considering the bowel loops' topographic distribution, Welch classified internal hernias into 8 types. The various anatomical sites include left and right paraduodenal (mesocolic) hernia, foramen of Winslow hernia (abnormally large foramina), pericecal hernia, transomental hernia, sigmoid-mesocolon-related hernia, transmesenteric hernia, supravesical (abnormally large foramina) and pelvic hernia.

The most frequent type of internal hernias, paraduodenal hernias (PDH), are caused by tiny bowel loops entering an aberrant fossa near the duodenum due to improper retroperitoneal anchoring of the mesentery with the parietal peritoneum. There are 2 types of paraduodenal hernia. The small intestine becomes trapped in “the fossa of Landzert, an uncommon congenital peritoneal fossa behind the descending mesocolon, in left PDH, that is more frequent. Located to left of IMV (inferior mesenteric

ISSN:1624-1940
http://magellanes.com/

vein) on the abdomen's left side is the hernial sac. The fossa of Waldeyer, which develops when a portion of the ascending mesocolon fails to fuse with posterior parietal peritoneum, is usually" the cause of right PDH (12). They are related to a nonrotated small intestine. The hernial sac is located to the right of SMA on the right side of abdomen. The common presentation of PDHs is a closed-loop intestinal obstruction. With a mortality rate of 20 to 50 percent, PDH carries a greater than 50% lifetime risk of intestinal infarction and strangulation (11). In some cases, there occurs a spontaneous reduction of partial or complete contents of the internal hernial sac upon laparotomy. Many centers have performed laparoscopic procedures.

In our study, we described a case of a left paraduodenal -internal hernia including closed loop obstruction with an impression (obtained while content was inside the orifice) of the constriction ring at ileocecal junction, initially diagnosed at distal ileal stricture. We aim to emphasize the importance of detailed clinical history taking and examination along with interpretation of relevant CT findings which aid in narrowing the diagnosis in cases of small bowel obstruction, the second most prevalent cause of acute abdomen. Thus, with a good preoperative diagnosis and plan, there is less morbidity and improved survival.

CASE REPORT:

An 18-year-old young girl who is pursuing her first year in nursing course who was attending her normal activities till 4 days back presented to emergency room with acute onset abdomen pain for 2 days which was severe diffuse abdomen pain .A history of 5-6 episodes of bilious vomiting was present and history of passing loose stools was present. She did not have any comorbid illness and had a DJ stent placed on the right side for renal and ureteric calculi 2months back.

She presented with severe abdomen pain with a pulse rate of 90 beats per minute, 120/80mmHg of blood pressure. On clinical examination, per abdomen was soft, abdomen distended including tenderness more in the right iliac fossa.

Investigations:

Investigations showed the normal total count (TLC-7000).X-ray erect abdomen illustrated – dilated small bowel loops concentrated over the left hypochondrium with multiple air fluid levels. Ultrasonogram showed dilated bowel loops with to and fro motion. CT abdomen on the night of admission to ER showed –features suggestive of intestinal obstruction due to a terminal ileal stricture.

ISSN:1624-1940
http://magellanes.com/

Figure xray erect abdomen - dilated small bowel loops -step ladder pattern with multiple air fluid levels

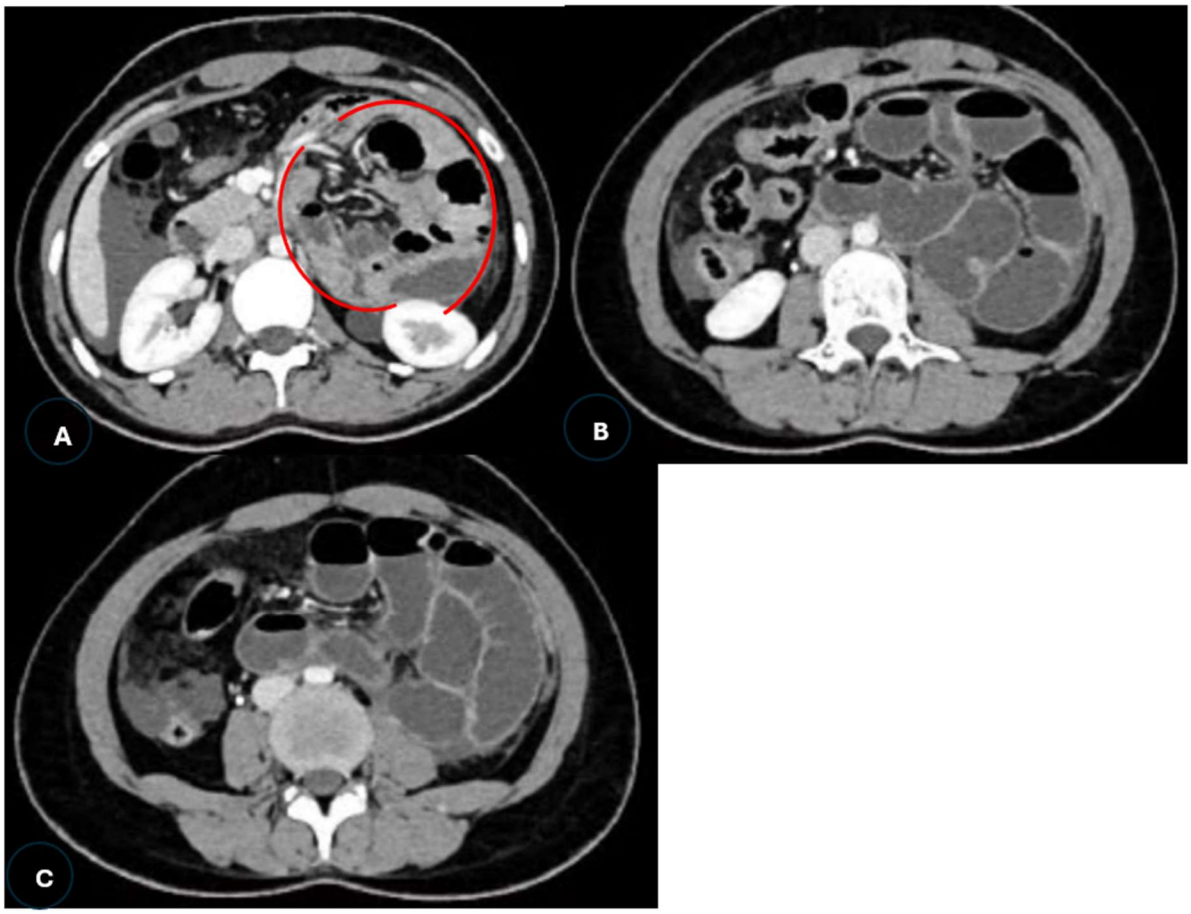


Figure A-Contrast enhanced CT showing left paraduodenal hernia -majority of small bowel inside

ISSN:1624-1940
http://magellanes.com/

fossa of Landzert,red line-sac,B,C-Dilated small bowel loops in left side

Initial Management:
Patient was admitted and initially managed conservatively with Ryles tube aspiration, IV fluids and IV antibiotics. Owing to the acute nature of the pain with no previous similar history the initial radiological diagnosis of distal ileal stricture was put to question. The CT image was reviewed and an internal hernia likely Left paraduodenal hernia was arrived by the radiologist. The CT showed dilated Small bowel loops (jejunal and proximal ileal loops) (~ 3.4cm) with multiple internal air-fluid levels, abrupt stricturous narrowing noted at distal ileum(length of ~2.2cm) , 3 cm from ileocecal junction and dilated jejunal loops are pushed towards left hypochondrium with features suggestive of small bowel obstruction including transition point at distal ileum.

Operative management:
Emergency exploratory laparotomy done.Intraoperative Findings showed dilated bowel loops seen with an impression of a narrow constriction ring (which was due to spontaneous reduction of the bowel from the constricted hernial orifice) seen at the terminal ileum which was present in right iliac fossa region of the abdomen. (green arrow in *figure 1*). Following which a bowel walk lead to the Lt PDH , with multiple dilated small bowel loops present inside the fossa of Landzert . Complete reduction of all the obstructed bowel loops was done from the Left paraduodenal hernia (*Figure 5*). After reduction of bowel loops , the fossa of Landzert identified (*Figure 2,3*).
***Procedure*:** Above findings are noted. Left paraduodenal hernia identified, spontaneously reduced terminal ileal loop, constricting band seen in right iliac fossa, rest of dilated jejunum which was still inside the paraduodenal hernial sac was reduced completely (*Figure4*), orifice obliterated by interrupted sutures. Bowel walk done, Lumen was patent, no ischemia or occlusion, except for a mild congested bowel segment proximal to the constricting ring, which was viable. The SMA along with the IMV were on either side of the sac's mouth. Closure of the hernial orifice done by inturupted sutures. Wash and drain placed, abdomen closed.

Figure 1green arrow showing impression caused by constricting ring at ileocaecal junction

ISSN:1624-1940
http://magellanes.com/

Figure 2white arrow -Orifice of fossa of Landzert after reduction of the hernial contents

Figure 3Gloved finger inside fossa of Landzert

Figure 4contents after reduction

ISSN:1624-1940
http://magellanes.com/

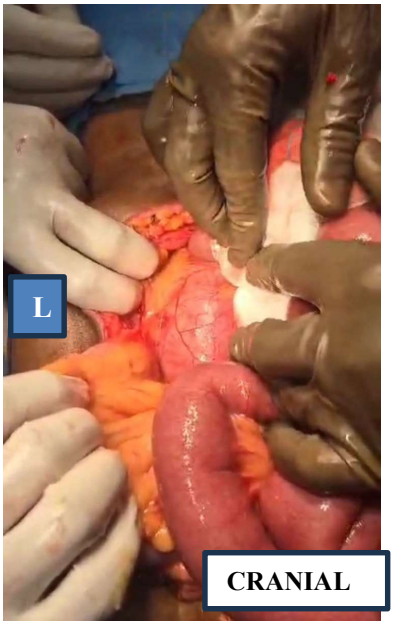


Figure 5Left paraduodenal hernia-Hernial sac with contents prior to reduction

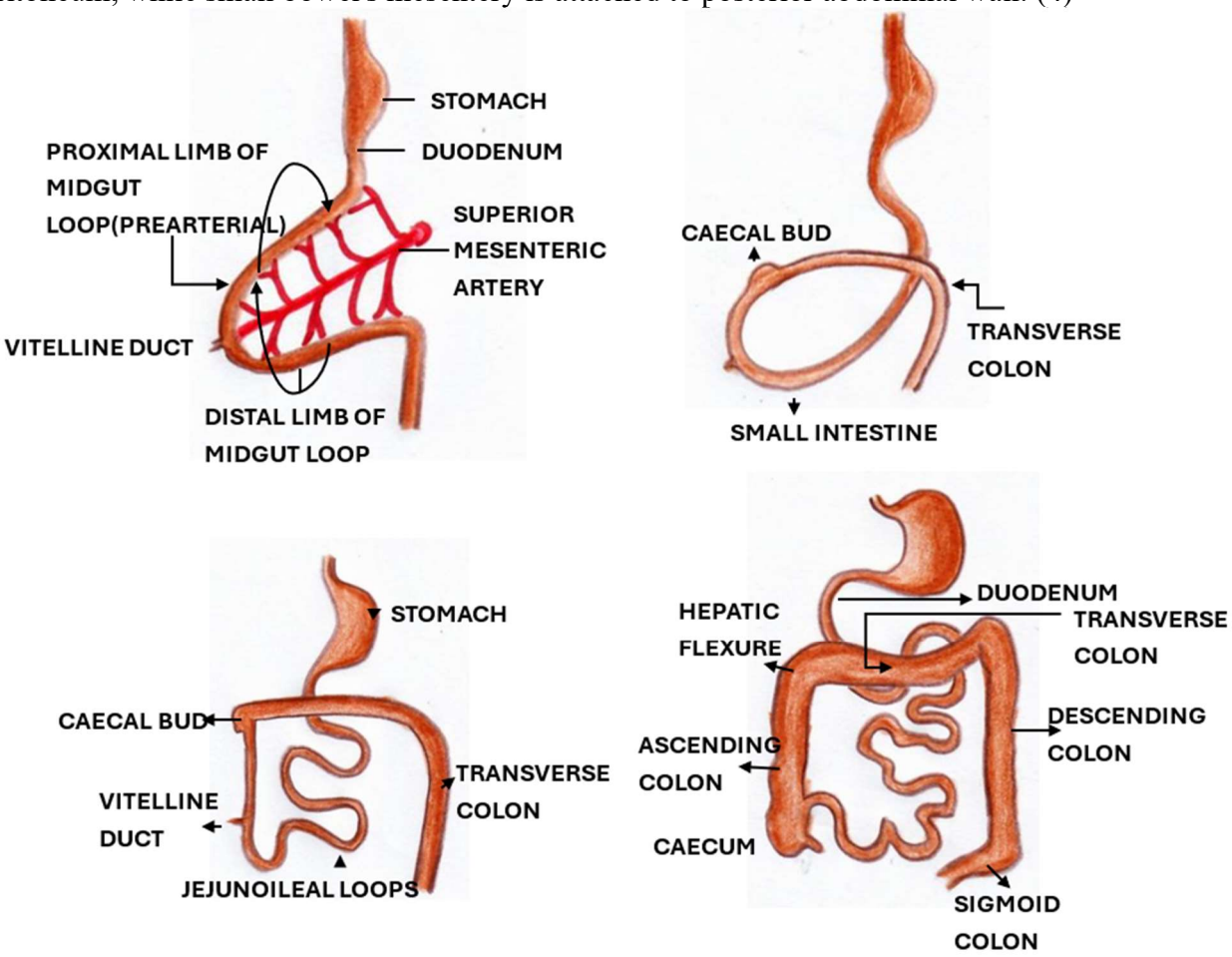
Post-operative outcome and follow up:
Patient recovered very well.Postoperative period uneventful. She consumed a normal diet and passed flatus and stools freely. Abdomen pain totally disapperared. She was discharged on post-op day 4. Patient followed up for 6 months with no complaints.

ETHICAL CONSIDERATION:
The patient gave permission for the data and pictures to be used in the publication.

DISCUSSION:
Internal hernias occur with an incidence of 0.2-0.9 percent among instances of intestinal obstruction with a male predominance in the ratio 3:1. (1) The general mechanisms whereby internal hernias occur are described in great length by various authors based on developmental abnormalities. Hence, it is vital to comprehend the embryology of gut and mesentery.
In the 4th week of fetal human gestation, the primitive gut tube is formed from the endodermal lining and yolk sac following cranial and caudal folding. Splanchnic mesoderm wraps around the gut tube the mesentery that suspects the gut within the body cavity. Nerves and neurons found in the wall of the gut tube are derived from neural crests. The small intestine is developed from midgut, except duodenum, a primitive foregut structure. In the 5th week of success, the length of the intestine starts to increase rapidly which is when the herniation of midgut occurs. Understanding this process of herniation of midgut with rotation and involution is crucial to understanding the pathophysiology of internal hernias and malrotation. The herniated midgut loop has a cranial limb (also known as prearterial limb or proximal limb) and a caudal limb (also known as distal limb). The cranial limb develops into caecum, proximal 2/3rds of transverse colon, ascending colon, and terminal ileum. The caudal limb develops into proximal ileum, jejunum, distal duodenum. The vitelline duct forms the junction of cranial and caudal limb which usually gets obliterated at birth but if persists it is called Meckel diverticulum. The endoderm proliferates and occludes the lumen at the end of fifth week. By the end of the 9th week, the apoptosis of endoderm coupled with expansion of mesoderm components of wall yield a patent gut tube.The

ISSN:1624-1940
http://magellanes.com/

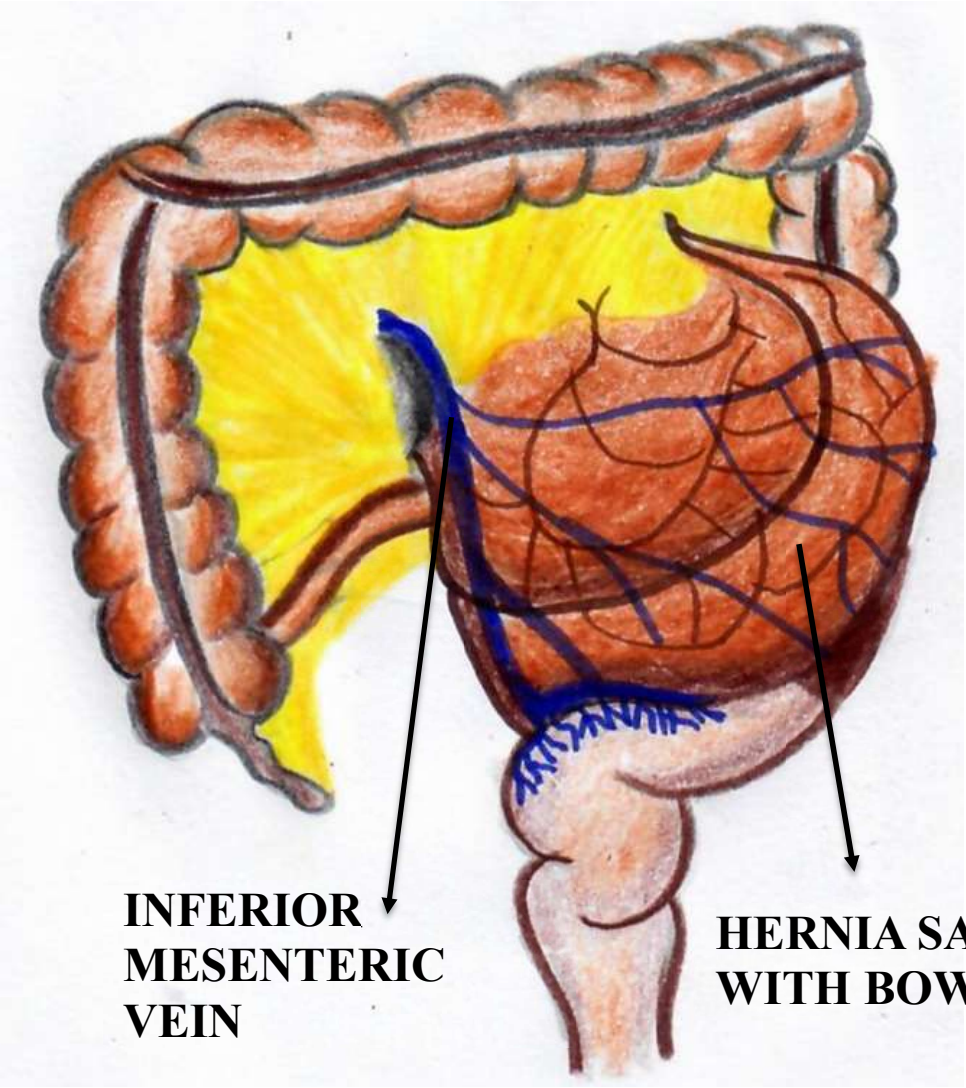
midgut loop undergoes a clockwise 270-degree rotation and the proximal jejunum re-enters the abdomen as well as occupies the abdomen's left side. The caecum enters last and occupies the right upper quadrant and subsequently descends to Right iliac fossa. Midgut herniation persists till 10th week only. The midgut becomes fixed and the mesenteries fuse. The interval is obliterated when a leaf of mesentery of colonic section of midgut, which has a posterior location, merges alongside posterior abdominal wall's peritoneum. The duodenum's mesentery merges with the posterior parietal peritoneum, while small bowel's mesentery is attached to posterior abdominal wall. (4)



The figure shows rotation of intestine (2)

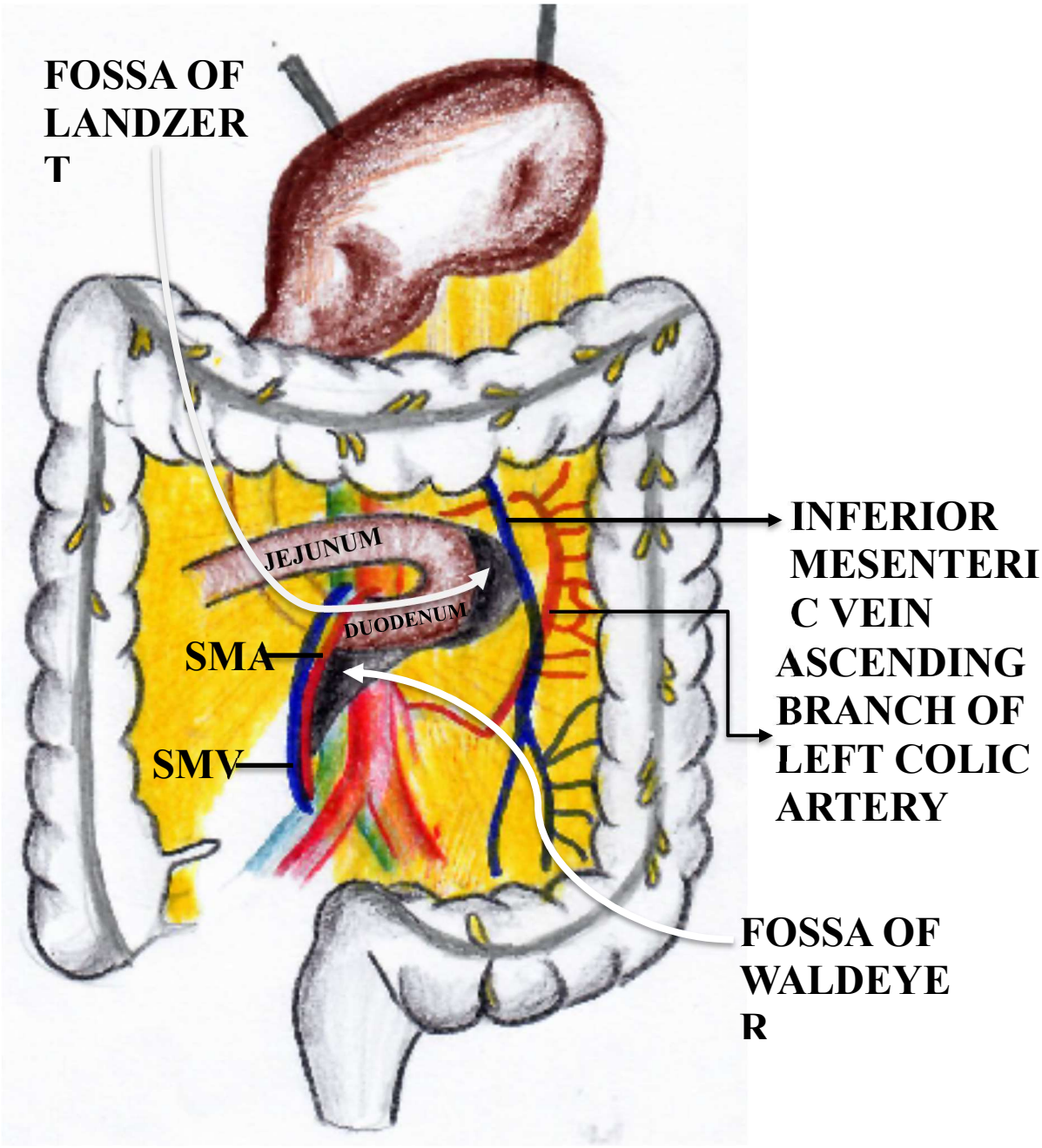
With a 50% incidence, PDH are the more prevalent kind of internal hernias. Of these, 75% are left paraduodenal (mesocolic) hernias. Callander et al (3). provided the best description of the mechanism behind the development of the left PDH. In the event of a left PDH, pre-arterial segment rotates abnormally, first to the left of the SMA and then posteriorly. The anterior boundary is developed "by ascending branch of left colic artery as well as IMV as the intestine invaginates into an unsupported section of descending mesocolon" throughout this phase. The small bowel lies behind mesentery of the descending colon in a peritoneum-lined pouch.

ISSN:1624-1940
http://magellanes.com/



The figure above shows -Left mesocolic (paraduodenal) hernia. Hernia opening lies to the left of midline, as well as herniated intestine is situated behind descending mesocolon's front wall (5).
For a left PDH to occur, Treitz has established three requirements (5): (1) existence "of a fossa (the fossa of Landzert); (2) existence of the IMV in the sac's neck; and (3) adequate small bowel movement to permit the small bowel to enter the sac from this fossa. Fossa of Landzert extends posteriorly to descending mesocolon and is situated to the left of the duodenum's 4th section. Immediately below duodenojejunal junction, the aperture is bounded anteriorly by ascending branch of left colic artery" as well as IMV.(4)

ISSN:1624-1940
http://magellanes.com/



The right PDH occurs due to the herniation of small bowel into the fossa of Waldeyer. When the midgut loop's prearterial limb is unable to spin around the SMA, a right mesocolic hernia results. Most of small intestine stays to the right of SMA as a result. Normal counterclockwise rotation of the cecum and proximal colon into the right side of the abdomen and fixation to the posterolateral peritoneum cause the small intestine to become trapped behind the mesentery of the right colon. The ileocolic, right colic, and middle colic vessels lie within the anterior wall of the sac, and the superior mesenteric artery courses along the medial border of the neck of the hernia.

PDH are indeed difficult to diagnose. The 1st-line imaging method for internal hernias is multidetector computed tomography (MDCT). Volume-rendered images and other three-dimensional (3D) images

ISSN:1624-1940
http://magellanes.com/

help with the best surgical planning and the comprehension of pathologic situations. To exclude alternative reasons of small bowel obstruction, intravenous contrast material should be used unless it is contraindicated. The hall mark points to diagnose internal hernias on CT are comprised of 3 key features which are mesenteric abnormalities, bowel configuration, and position of the surrounding viscera. These are vital for the general surgeon to make an unerring diagnosis of internal hernias.

- During a small-bowel obstruction, dilated small intestinal loops occur in an inappropriate anatomical location.
- Mesenteric fat and vascular convergence at the hernia orifice
- Important mesenteric vessels being displaced
- Symptoms of strangulation include mesenteric vascular congestion, twisting, and stretching.
- Displacement of the hernia sac's surrounding structures

In 2020, Saurabh et al reported a case of a male with 65 years who described with subacute intestinal obstruction along with was diagnosed to have a left PDH and had been managed conservatively. He stated that a follow-up scan 11months later showed total spontaneous resolution, however, the patient experienced recurrent episodes of apparent clinical signs of spontaneous reduction as well as re-herniation throughout the follow-up period.(6)

In 2021, Dragan Manojlović et all reported a case of a male (39 year) who having left paraduodenal hernia presented to the ER with acute small bowel obstruction underwent a laparotomy and meticulous decompression of trapped viable small bowel. This report placed an emphasis on early accurate diagnosis as unrecognized Left PDH could cause perforation, peritonitis, mesenteric ischaemia, and even death.

Kamleshsingh Shadhu et all reported 5 cases of PDH where the main method used during laparotomy was to widen or close the hernia orifice, which allows hernia sac to become a section of peritoneal cavity, and release the intestinal loops from the hernia sac to heal the defect.(10)

A recent case report in April 2024 by Barbara Brogna et al, reported a male of 83 year having small bowel obstruction secondary to a left PDA. At the level of the Treitz ligament, the patient's first abdominal MDCT including contrast administration showed a noticeably enlarged stomach as well as clustered-like proximal jejunal loops including walls which is thickened, but no evidence of necrosis or ischemia. The patient was managed conservatively initially but with deterioration of symptoms, a repeat imaging by MDCT WITH water-soluble iodine contrast agent (Gastrografin) was ordered. Patient underwent a laparotomy with a reduction of contents from the 3 cm wide hernial orifice. The report places a strong need for surgeons and radiologists to reignite the possibility of internal hernias as a preoperative diagnosis to decrease the length of hospitalization as well as the danger of mortality, primarily in older people, who might have a numerous of comorbidities. (8)

Vijay Anand et all reported a circumstance of right PDA shown as acute small bowel obstruction. Upon laparotomy, extensive ischaemic segment of small bowel was noted, and keeping in mind the high mortality rates of short bowel syndrome, a staged procedure was provided to the patient wherein the first surgery involved decompression and bowel walk with bagota bag closure and post op- close intensive care for 18 hours. The second procedure was taken up after 18 hours, where in it was found that the areas of gangrenous segment had demarcated well to allow clear differentiation and to preserve small bowel length. (1)

Our patient presented with severe abdominal pain that was progressively worsening. The initial CT findings only revealed a distal ileal stricture which was inconsistent with the short duration of the patients' symptoms. A prompt relook into the CT findings by the general surgeon resulted in a quick

ISSN:1624-1940
http://magellanes.com/

and accurate diagnosis of internal hernia. An informed look into the laparotomy made intraoperative diagnosis and management easier. The spontaneous reduction of small bowel from the hernial orifice is to be noted.The patient recovered without any complications. Our case highlights the importance of insight into the possible diagnosis of internal hernias amongst the staggering number of small bowel obstructions being operated on.

CONCLUSION:

A thorough comprehension of embryology, pathophysiology, CT findings and mechanisms of internal hernias is crucial to the general surgeon, especially in the present period of time with the rise in the number of bariatric surgeries and liver transplantations and frequency of operable intestinal obstruction cases.

During an ongoing intestinal obstruction, just 20% of the mesenteric capillaries are left open for perfusion till bowel strangulation with oxygen debt ensues and threshold is broken. Thus, in an early presentation, this pathophysiological adaptation of the splanchnic circulation should buy us time, enough to make a good preoperative diagnosis and minimize the number of late laparotomies before gangrene sets in.

A keen clinical suspicion of internal hernias backed up by imaging is the key to clinch the preoperative diagnosis in cases of acute intestinal obstruction due to internal hernias.

REFERENCES:

1. Ismavel VA, Kichu M, Hechhula DP, et al. BMJ Case Rep 2021;14:e239250. doi:10.1136/bcr-2020- 239250
2. From Podolsky DK, Babyatshy MW. Growth and development of the gastrointestinal tract. In: Yamada T, ed. Textbook of Gastroenterology. Vol 2. Philadelphia: JB Lippincott; 1995
3. Callander CL, Rusk GY, Nemir A. Mechanism symptoms and treatment of hernia into the descending Mesocolon (Left Duodenal Hernia). A plea for a change in Nomenclature. Surg Gynec Obstet. 1935;60:1052–1071.
4. Vanmali A, Maharajh J, Haines M. Left paraduodenal hernia: Embryological and radiological findings. S Afr J Rad. 2021;25(1), a1979
5. From Brigham RA, d'Avis JC. Paraduodenal hernia. In: Nyhus LM, Condon RE, eds. Hernia. 3rd ed. Philadelphia: JB Lippincott; 1989:484–485. C, D, From Brigham R, Fallon WF, Saunders JR, et al. Paraduodenal hernia: diagnosis and surgical management. Surg. 1984;96:498–502.
6. Maheshwari, S., Khadka, A., Bhattacharjee, S. *et al.* A case report of left paraduodenal hernia with a spontaneous reduction on follow-up: the rare demonstration on computed tomography. *Egypt J Radiol Nucl Med* **51**, 224 (2020)
7. Zenitani M, Sasaki T, Tanaka N, et al. Strangulated right paraduodenal hernia successfully treated with single-incision transumbilical surgery. J Pediatr Surg Case Rep 2017;22:1–4)
8. Barbara Brogna, Luigi Urciuoli, Lanfranco Aquilino Musto, Lorenzo Iovine,
9. A late presentation of a left paraduodenal hernia in an elderly patient admitted in emergency: A case report,Radiology Case Reports,Volume 19, Issue 4,2024,Pages 1356-1360,ISSN 1930-0433.
10. Shadhu, K., Ramlagun, D. & Ping, X. Para-duodenal hernia: a report of five cases and review of literature. *BMC Surg* **18**, 32 (2018)
11. Gusz JR, Wright LM. Intestinal obstruction secondary to left paraduodenal hernia. J Surg Case Rep. 2015:2015.

ISSN:1624-1940
http://magellanes.com/

12. Doishita, S., Takeshita, T., Uchima, Y., Kawasaki, M., Shimono, T., Yamashita, A., … Miki, Y. (2016). *Internal Hernias in the Era of Multidetector CT: Correlation of Imaging and Surgical Findings. RadioGraphics, 36(1), 88–106.*