Abstract:
Paraduodenal hernias are rare type of internal hernias that result from error of rotation of the mid-gut. It can be discovered incidentally at laparotomy, seen on radiological imagining or infrequently cause intestinal obstruction. We report a case of a right paraduodenal hernia diagnosed intraoperatively after being operated on in the emergency setting for intestinal obstruction. He required resection of gangrenous segment of small bowel with primary anastomosis. The mouth of the sac was obliterated by non absorbable suture apposition to the posterior wall. The patient was discharged on day 10th after an uneventful recovery.

Keyword: Malrotation, paraduodenal fossae, Waldayer

INTRODUCTION
Paraduodenal hernia is the most common type of internal hernia, accounting for 53% of reported cases. The term ‘paraduodenal hernia’ refers to a hernia of the entire small bowel, or part of it, into a sac derived from folds of peritoneum and fossae normally found at the terminal or 4th portion of the duodenum. It represents a rare congenital anomaly which arises from an error of rotation of the midgut. There are two variants, right and left paraduodenal hernia, the right being less common. A right paraduodenal hernia is formed when the prearterial limb fails to rotate around the superior mesenteric artery (SMA). The prearterial segment is the portion cephalic to the vitello-mesenteric duct and comprises the distal duodenum and the entire small bowel to the distal ileum. Therefore, a portion of the small bowel remains to the right of the SMA. Fusion of the ascending colonic mesentery to the retroperitoneum causes entrapment of the bowel within the primitive coelom, affecting from a single loop to the entire small bowel. The result is a hernia orifice that is always to the right of the mid-line and usually faces medially and slightly downward. The mesentery of the ascending colon and a portion of
the transverse colon make up the anterior wall of the sac, while the SMA and ileocolic artery lie in the free edge of the sac. Signs and symptoms of paraduodenal hernia are extremely variable and may occur at any age. The majority of cases are noted between the 4th and 6th decades of life. The average age at diagnosis described is 38.5 years. Based on the Japanese literature, 70% of cases were male, and the mean age at onset was 39.5 years. The most common presentation is acute small bowel obstruction, with crampy abdominal pain, nausea, vomiting and distension. The patient may complain of vague and chronic abdominal pain or periodic distension, which results from partial obstruction. Intermittent postprandial abdominal discomfort or tenderness may result in weight loss. The severity of signs and symptoms is directly proportional to the degree of obstruction.

**CASE REPORT**

A 21-year-old man was admitted to the emergency department of our hospital with complaints of severe intermittent colicky hypogastric pain of 24 h duration. He reported having experienced similar episodes every six months, but the pain resolved spontaneously every time. On this occasion, his abdominal pain progressed to become generalized in nature and associated with episodes of vomiting. He stated that eating made the pain worse. He complained of mild abdominal distention and passed stool 1 day before but no flatus. He had no history of abdominal surgery. On physical examination, he was moderately dehydrated with moderate tachycardia but normal blood pressure. The abdomen was tense with generalized tenderness with hypogastric predominance. His symptoms were out of proportions to the signs. Abdomen x-ray revealed multiple dilated intestinal loops with air fluid level. Patient was resuscitated with iv fluids n electrolyte imbalances were corrected. Emergency ultrasound was done which suggested, dilated aperistaltic entangled bowel loops found in the subhepatic region with bowel wall thickening. Doppler image showed absent vascularity to the bowel loops. Moderate free fluid abdomen noted. A diagnosis of small bowel obstruction with ischaemia, small bowel mass was made. Emergency lapotomy was done. Right paraduodenal hernia with gangrenous small bowel with gangrene extending to the herniated segment of the small bowel, was seen. The ascending colon was mobilised by dissecting along the lateral peritoneal fold. Neck of the hernial sac was eliminated with this manuvere and the Hernial contents were carefully reduced. Eight feet of Gangrenous ileum was resected, primary enteric anastomosis was done between proximal and terminal ileum. The abdomen was Abdomen closed with intra peritoneal drain. Patient recovered well without complications.

![Gangrenous Herniated Bowel](image)
DISCUSSION

The term ‘Para duodenal hernia’ refers to a hernia of the entire small bowel, or part of it, into a sac derived from folds of peritoneum and fossae normally found at the terminal or 4th portion of the duodenum. No less than 10 such peritoneal fossae have been described, but the most frequently encountered are: inferior Para duodenal fossa of Treitz (60%), combined superior and inferior Para duodenal fossae (30%), superior Para duodenal fossa (5%), Para duodenal fossa of Landzert (2%), duodenojejunal or mesocolic fossa (2%), and fossa of Waldeyer (1%). Approximately 75% of Para duodenal hernias occur on the left side of the abdomen and involve the Para duodenal fossa of Landzert; 25% develop on the right, involving the fossa of Waldeyer, located in the mesojejenum, beneath the SMA and immediately below the duodenum. Their presence is more common in men than women, with a ratio of 3:1. Para duodenal hernias are derived from an error of rotation of the midgut, the portion of the intestinal tract receiving its blood from the SMA. It is divided into two segments. The portion cephalic to the vitello-mesenteric duct is called the prearterial segment and comprises the distal duodenum and the entire small bowel to the
distal ileum. The caudal portion, or postarterial segment, comprises the distal ileum, cecum, appendix, ascending colon and proximal two thirds of the transverse colon. At about the 4th to 5th week of fetal development, the midgut rate growth exceeds the rate growth of the body stalk and elongates, forming the primary intestinal loop. Due to this rapid elongation as well as the increasing size of the liver, a physiologic herniation at the umbilical ring occurs. By about the 10th to 12th week the abdominal cavity has increased in size and the midgut has gradually returned within it. The midgut has now rotated 90° in a counterclockwise direction on the axis of the SMA. The prearterial segment occupies the right side of the abdominal cavity, and the postarterial segment the left side. Arrest at this point of rotation will produce the relatively common picture of nonrotation of the intestine. Normally the prearterial segment continues to rotate an additional 180° counterclockwise, first behind and then to the left of the SMA, so that it comes to lie to the left of the midline in the abdominal cavity. The postarterial segment also rotates, led by the cecum, which passes counterclockwise anterior to the SMA into the right upper quadrant. The cecum may not complete its descent to its normal position in the right lower quadrant until about the end of the 5th month of life of the embryo. Later, fusion of the mesenteries and fixation of the midgut occurs, from the ligament of Treitz in the left upper quadrant to the cecum in the right lower quadrant. The ascending and descending colon fuse with the retroperitoneum. As mentioned, a right Para duodenal hernia is formed when the prearterial limb fails to rotate around the SMA, and a portion of the small bowel remains to the right of it.

The 6-month history of intermittent episodes of postprandial nausea, vomiting, abdominal pain and distension was suggestive of a partial small intestinal obstruction. Unfortunately, these nonspecific symptoms are often mistakenly attributed to biliary disease, gastritis, or gastroesophageal reflux. Physical examination is usually not revealing unless the hernia is large enough to produce an abdominal mass or causes intestinal obstruction. The first correct preoperative diagnosis of a paraduodenal hernia was made by Kummer in 1921, who described its presence by a barium swallow. Later, Taylor in 1930 diagnosed a case of right paraduodenal hernia by radiologic appearances. A plain abdominal film will usually show an agglomeration of dilated small bowel loops. A definitive preoperative diagnosis may still be made by an upper gastrointestinal series with small bowel follow-through that shows an ovoid collection of contrast-filled small bowel loops either to the right or left of the midline of the abdomen. In a right paraduodenal hernia, as seen in our case, collection of bowel loops is noted lateral and inferior to the descending duodenum, in the right half of the transverse mesocolon, or behind the ascending mesocolon. These bowel loops cannot be displaced despite repositioning of the patient. There is absence of small bowel in the pelvis, except when most of the terminal ileum is outside the hernia sac. Barium enema examination may show a colon in its usual position or the cecum may be only incompletely rotated and lie in the right upper quadrant. Since the SMA and its branches to the cecum and ascending colon lie in the anterior wall of the hernia sac, its injury may result if hernia reduction is attempted by opening the sac in this area. Surgical management has been
successfully performed with the laparo-
scopic approach in patients with no bowel necrosis or severe dilata-
sion. Operative treatment of hernia has been debated. Paraduodenal hernias are associated with a 50% lifetime risk of incarceration, which may lead to bowel obstruction and strangulation. Therefore, treatment has been recommended. The mortality rate is not clear but approximates 20–50%, due to the large proportion of patients with intestinal obstruction and ischemia requiring emergency surgery. There is a poorer prognosis if strangulation occurs and a long segment of small bowel is rendered ischemic. Moreover, this may result from delay in intervention, as signs of peritonitis may be masked by the retroperitoneal position of the hernia.

CONCLUSION
Paraduodenal hernia is a rare congenital anomaly arising from an error of rotation of the midgut. The duodenum and small intestine become trapped in a sac, lined by peritoneum, behind the mesentery of the colon, either to the right or left of the midline. This may be an incidental discovery at laparotomy or a rare cause of small bowel obstruction progressing to strangulation and perforation. Increasingly, the diagnosis is made on CT scan in patients with non-specific abdominal pain or imaging for other reasons. Bearing this diagnosis in mind, it may be suspected on preoperative X-ray examination. The small bowel loops are all on the right or on the left of the midline. Barium enema is also helpful. With a lifetime risk of obstruction being 50%. The surgical approach is dictated by