

# Malrotation of Gut With Horse Shoe Kidney

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### ABSTRACT

We report case of malrotation of gut with horse shoe kidney. Plain abdominal x ray reveals no pneumo-peritoneum, abnormal calcification, and abnormal gut loop seen. Where as on barium study, small gut situated in right side of abdomen with ileo-cecal

junction located in Left iliac fossa. Complementary gray scale ultrasound done, no gut mass/dilatation, vicero-megaly appreciated however it showed horse shoe kidney. CT showed also horse shoe kidney.

**Key Word:** Malrotation of Gut, Volvulus, Intestinal Obstruction, Horse Shoe Kidney.

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### CASE REPORT

A female patient kalsoom 32 years old, married, came to OPD, presented with vague abdominal discomfort off and on vomiting for last 2-3 years. No history of diarrhea, malena, constipation, HTN and diabetes. On general physical examination (GPE) patient was pale but systemic examination was unremarkable. Routine investigation reveals Hb=7 gm/dl. Plain abdominal x ray showed no pneumo-peritoneum, no abnormal calcification, and no abnormal gut loop seen. Where as on barium study, small gut was situated in right side of abdomen with ileo-cecal junction located in Left iliac fossa. Complementary gray scale ultrasound was done, no gut mass/dilatation, vicero-megaly appreciated however revealed horse shoe kidney. CT showed horse shoe kidney.

### DISCUSSION

Many authors define intestinal malrotation as intestinal non rotation or incomplete rotation around the superior mesenteric artery (SMA). It involves anomalies of intestinal fixation as well. Interruption of typical intestinal rotation and fixation during fetal development can occur at a wide range of locations; Non-rotation is misnomer, since it describes a condition resulting from a 270 anticlock wise rotation. In this condition the entire small bowel comes to lie on the right and the colon on the left of the abdomen. Reversed rotation is a 90 clock wise rotation which brings the traverse colon behind duodenum<sup>1</sup>. This leads to various acute and chronic presentations of

disease. The most common type found in pediatric patients is incomplete rotation predisposing to midgut volvulus, which can result in short-bowel syndrome or even death. Malrotation was reported prior to the 1900s. During the 20th century, understanding of the embryology and anatomy of malrotation became more complete, along with changes in surgical approaches to the problems. In 1936, William E. Ladd wrote the classic article on treatment of malrotation, and his surgical approach (i.e., Ladd procedure) remains the cornerstone of practice today.<sup>2</sup> Younger patients have higher rates of morbidity and mortality. In infants, the mortality rate ranges from 2-24%. The presence of necrotic bowel at surgery increases the mortality rate by 25 times for infants, and the presence of other anomalies increases the risk by 22 times. A report of 25 years' experience demonstrated congenital cardiovascular disease in 27.1% of patients with intestinal malrotation; those patients had a morbidity rate of 61.1% after intestinal malrotation surgery.<sup>3</sup> Male predominance is observed in neonatal presentations at a male-to-female ratio of 2:1. No sexual predilection is observed in patients older than 1 year. As many as 40% of patients with malrotation present within the first week of life. This condition is diagnosed in 50% of patients by age 1 month and is diagnosed in 75% by age 1 year. The remaining 25% of patients present after age 1 year

and into late adulthood; many are recognized intraoperatively during other procedures or at autopsy. Intestinal malrotation is a congenital anomaly of rotation of the midgut (embryologically, the gut undergoes a complex rotation outside the abdomen). As a result:

- The small bowel is found predominantly on the right side of the abdomen.
- The cecum is displaced (from its usual position in the right lower quadrant) into the epigastrium - right hypochondrium.
- The ligament of Treitz is displaced inferiorly and rightward.
- Fibrous bands (of Ladd) course over the horizontal part of the duodenum (DII), causing intestinal obstruction..
- The small intestine has an unusually narrow base, and therefore the midgut is prone to volvulus (a twisting that can obstruct the mesenteric blood vessels and cause intestinal ischemia).

This can lead to a number of disease manifestations such as:

- Acute midgut volvulus.
- Chronic midgut volvulus.
- Acute duodenal obstruction.
- Chronic duodenal obstruction.
- Chronic duodenal obstruction.
- Superior mesenteric artery syndrome.

The exact causes are not known. It is not associated with a particular gene, but there is some evidence of recurrence in families.<sup>[4]</sup> Patients (often infants) present acutely with midgut volvulus, manifested by bilious vomiting, crampy abdominal pain, abdominal distention, and the passage of blood and mucus in their stool. Patients with chronic, uncorrected malrotation can have recurrent abdominal pain and vomiting. Malrotation can also be entirely asymptomatic. With acutely ill patients, consider emergency surgery laparotomy if there is a high index of suspicion. Plain radiography may demonstrate signs of duodenal obstruction with dilatation of the proximal duodenum and stomach but it is often non-specific. Upper gastrointestinal series is the modality of choice for the evaluation of malrotation as it will

show an abnormal position of the duodeno-jejunal flexure (ligament of Treitz). This normally lies to the left of the body of first or second lumbar vertebra.<sup>1</sup>In cases of malrotation complicated with volvulus, it demonstrates a corkscrew appearance of the distal duodenum and jejunum. In cases of obstructing Ladd bands, it will reveal a duodenal obstruction. In equivocal cases, contrast enema, may be helpful by showing the cecum at an abnormal location. It is usually discovered near birth, but in some cases is not discovered until adulthood.<sup>5</sup> In adults, the "whirlpool sign" of the superior mesenteric artery can be useful in identifying malrotation<sup>6</sup>.

**Figure-1**  
**Film of barium follows through showing small gut on right side with DJ on right.**



**Figure-2**  
**Film of barium follows through showing ileo-cecal junction in Left iliac fossa**



**Figure-3**

Gray scale ultrasound showing isthmus in the centre connecting both kidneys



**Figure-4**

Plain CT Abdomen Showing Isthmus In The Centre Connecting Both Kidneys



### TEACHING POINT

Intestinal malrotation is a congenital anomaly of rotation of the midgut (embryologically, the gut undergoes a complex rotation outside the abdomen). As a result: The small bowel is found predominantly on the right side of the abdomen, The cecum is displaced into the epigastrium right hypochondrium, The ligament of Treitz is displaced inferiorly and rightward, Fibrous bands (of Ladd) course over the horizontal part of the duodenum (DII), causing intestinal obstruction, The small intestine has an unusually narrow base and therefore the midgut is prone to volvulus (a twisting that can obstruct the mesenteric blood vessels and cause intestinal ischemia) can lead to Acute midgut volvulus. Chronic midgut volvulus. Acute duodenal obstruction, Chronic duodenal obstruction. Internal herniation, Superior mesenteric artery syndrome.

### REFERENCES

1. David Sutton. "Anomalies of Mid gut rotation", Text book of Radiology and Imaging, vol II 1999:1092-93.
2. Guidelines Ladd WE. Surgical Diseases of the Alimentary Tract in Infants. N Engl J Med. 1936; 215:705-8.
3. Kouwenberg M, Severijnen RS, Kapusta L. Congenital cardiovascular defects in children with intestinal malrotation. *Pediatr Surg Int.* 2008;24:257-63.
4. Stalker HJ, Chitayat D 1992. "Familial intestinal malrotation with midgut volvulus and facial anomalies: a disorder involving a gene controlling the normal gut rotation?" *Am. J. Med. Genet.* 1992, 44: 46-7.
5. Dietz DW, Walsh RM, Grundfest-Broniatowski S, Lavery IC, Fazio VW, Vogt DP 2002. "Intestinal malrotation: a rare but important cause of bowel obstruction in adults.
6. *Dis. Colon Rectum* 2002, 45: 1381-6.
7. Yeh WC, Wang HP, Chen C, Wang HH, Wu MS, Lin JT 1999 "Preoperative sonographic diagnosis of midgut malrotation with volvulus in adults: the "whirlpool" sign". *Journal of clinical ultrasound: JCU* 27 1999: 279-83.

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