

# Malrotation of gut - A case report

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## Abstract

**Intestinal Malrotation** is a congenital anatomical anomaly which results from an abnormal rotation of the gut as it returns to the abdominal cavity during embryogenesis.

**Keywords:** Malrotation, SMA - SMV axis, Ladd's Bands, Wirlpool appearance.

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Received Date: 08/11/2015 Revised Date: 12/12/2015 Accepted Date: 10/01/2016

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Quick Response Code:	Website: <a href="http://www.statperson.com">www.statperson.com</a>
	Volume 6 Issue 1

## INTRODUCTION

Intestinal Malrotation is a congenital anatomical anomaly which results from an abnormal rotation of the gut as it returns to the abdominal cavity during embryogenesis. It is torsion of entire gut around SMA due to short mesenteric attachment of small intestine. In 20% associated with:

- Duodenal atresia
- Duodenal diaphragm
- Duodenal stenosis
- Annular pancreas

Although some individuals live their entire life with malrotated bowel without symptoms, the abnormality does predispose to you and internal hernias, with the potential for life threatening complications.

## CASE REPORT

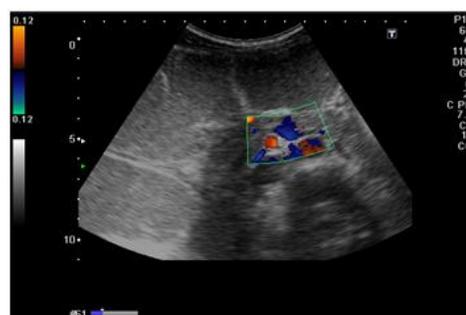
A 18 year old patient presented to Surgery OPD with complaints of

- Pain in abdomen

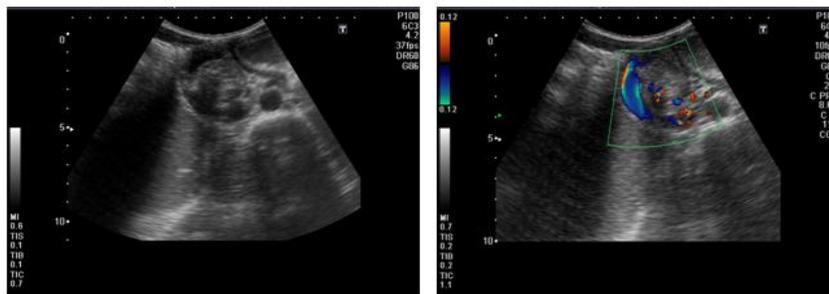
- Persistent Vomiting not relieved by treatment since 4-5 months
- Passing very small amount of stools after every 4-5 days
- Loss of weight

Clinical examination findings were not significant. Routine blood and urine investigations also failed to show any significant abnormality. No electrolyte imbalance was seen. Patient was referred to Department of Radiodiagnosis for USG Abdomen.

- USG with Color Doppler Imaging (CDI) revealed –
- Gross dilation of stomach and duodenum with arrowhead type compression over spine
- Superior Mesenteric Vein (SMV) wrapping clockwise around superior mesenteric artery (SMA)
- Superior mesenteric vein to the left of superior mesenteric artery



**Figure 1:** Color Doppler Imaging: Superior mesenteric vein to the left of superior mesenteric artery



**Figure 2** a) B-mode imaging and b) Color doppler imaging: Clockwise Whirlpool Sign showing superior mesenteric vein wrapping around superior mesenteric artery



**Figure 3:** CECT Scan Abdomen showing winding of SMV around SMA typical of midgut rotation

(CT Scan – Plain + Contrast) of the patient showed Malrotation of the gut along the SMA+SMV axis. Whirlpool sign was seen. Collection of small intestine in the right iliac fossa with volvulus.

### ASSOCIATED FEATURES

An exploratory laparotomy was planned to relieve the obstruction. On table findings were as follows:



**Figure 4:** Intraoperative image showing grossly dilated duodenum with normal small bowel loops

- Gross dilatation of stomach was seen along with dilated duodenum
- Small intestine was seen on the right side and colon along with caecum on left side.
- Appendicectomy was done and stump ligated.
- Ladd’s bands were divided. Obstructing adhesions were divided.
- Volvulus was derotated.
- Haemostasis was achieved.



**Figure 5:** Intraoperative image showing normal caecum with Appendicectomy stump

Post surgery recovery of the patient was dramatic. However, patient passed copious liquid stools 3 days post surgery. Also there was a large quantity of RT aspirate for which equal amount of potassium replacement was given. Care was taken to maintain the urine output. Patient was shifted to oral liquids on 7th day post surgery. Potassium replacement through IV fluids was maintained. We started a high protein diet for the patient. He was discharged 20 days post surgery.

At discharge, there were no obstructive symptoms. Stool frequency was normal, with normal consistency. No nausea or vomiting symptoms were seen.

### DISCUSSION

Malrotation of the small-bowel mesentery around the superior mesenteric artery occurs when the normal process of gut development is arrested during fetal development. In the first trimester the duodenum fuses to the posterior body wall and becomes retroperitoneal

where as the remainder of the small bowel and its mesentery herniates into umbilical cord undergoes a counter clockwise rotation about the superior mesenteric artery the result is that the normal jejuna ileal mesentery extends obliquely from duodenal jejunal junction in the left upper quadrant to the ileocaecal valve in right lower quadrant. Any arrest in the normal 270<sup>0</sup> anticlockwise rotation occurring during physiological umbilical herniation results in malrotation and malfixation of the small bowel. The DJJ will be displaced medially and inferiorly and /or the caecum will be displaced medially and superiorly. The length of the small bowel mesentery is consequently shortened and the risk of the entire small bowel twisting on its narrow pedicle is increased mid gut volvulus leads to small bowel obstruction occlusion of superior mesenteric vessels, ischemia and if not recognized complete small bowel infarction. Abnormal peritoneal bands passing from caecum to cross the duodenum (Ladd's Bands) are often present in malrotated patients. They may contribute towards partial duodenal obstruction but are rarely the sole cause. The clinical presentation of Malrotation often correlates to the age of presentation<sup>1</sup>. In the infant, the most common presentation is with a midgut volvulus. Patient with intestinal non rotation have a lower incidence of mid gut volvulus than other types of Malrotation.

In the older child or even adult presentation is more frequently intermittent with episodes of spontaneously resolving duodenal obstruction. This is thought to be due to kinking of the duodenum by Ladd bands rather than a volvulus<sup>1</sup>. Internal hernias are also encountered. In some

individuals, presentation is very non-specific with episodes of abdominal pain, weight loss, malaena, or even chronic pancreatitis<sup>1</sup>. The most direct imaging technique for identifying mid gut malrotation is a barium upper GI tract examination; however, the diagnosis can be strongly suggested at cross sectional imaging.<sup>2</sup> There has been recent interest in the role of ultrasound. Approximately 70% of malrotated patients demonstrate inversion of the normal relationship of the superior mesenteric artery and vein lying in an abnormal position anterior and to the left of the artery; however, sensitivity and specificity of this reversal sign are not sufficient to enable its use as screening technique. Ultrasound appearances may be normal in surgically proven malrotation and conversely, an abnormal relationship has been demonstrated in normal children<sup>3</sup>. CT Scan findings in mid gut volvulus include reversal of the normal relationship between the superior mesenteric artery and vein and twisting of the mesentery around the artery, which creates a Whirlpool appearance<sup>4</sup>.

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Source of Support: None Declared  
Conflict of Interest: None Declared