Malrotation of Gut

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Malrotation

Normal Rotation

Midgut maturation has four stages between 5-10 weeks

1.Herniation

- 2.Rotation
- **3.**Retraction

4.Fixation

During 4th week of gestation, gut herniates into extraembryonic coelom due to disproportionate growth and length.

Then gut enters into abdomen while undergoing rotation by making three separate 90 degree turns all in counter clockwise direction around superior mesenteric artery.

• Ist turn occurs outside abdomen.

- 2nd turn while bowel is entering
- 3rd turn when gut has entered.
- When last turn occurs, DJ limb is positioned to left of superior mesenteric artery and caecocolic limb is on right.
- Fixation of ascending colon, descending colon and mesentry then occurs with a wide mesentry.

diagram



ROTATIONAL ANOMALIES

Rotational anomalies occurs when gut fails to rotate or rotation is incomplete.

Rotational anomalies may be isolated or occur along with gastroschisis, omphaloceles or congenital diaphragmatic hernia.

1.Nonrotation- Failure of 270 degree counterclockwise rotation. DJ limb lies in right hemiabdomen and caecocolic limb in left hemiabdomen with narrow mesentry.

2.Incomplete rotation (classical malrotation)- Normal rotation is arrested at 180 degrees and caecum lies in the upper abdomen and colon on left hemiabdomen. Ladd's bands cross the DJ loop and obstructs the duodenum.

3.Reversed rotation- 90 degrees counter clockwise rotation and 180 degrees clockwise rotation and transverse colon lies behind the duodenum.

4.Non fixation of the ascending colon , caecocolic loop, descending colon can occur.



Presentation

Incidence 1 in 6000 live births

1.Bilious vomitings – Typically, up to 75% present during 1st month of life with bilious vomitings. In a neonate with bilious vomiting always rule out malrotation.

2. Midgut volvulous - Abdominal pain and distension of abdomen with rapid deterioration in general condition, abdominal tenderness, pallor, sepsis and shock due to mesenteric ischemia.

- 3. Chronic duodenal obstruction in later life.
- Failure to thrive.
- Recurrent mild abdominal discomfort
- Gastroesophageal reflux (GERD)
- Recurrent partial volvulous with lymphatics and venous obstruction leading to malabsorption and nutritional deficiency.
- Incidental detection in children and adults during routine radiographic evaluation of the gut.

Diagnosis

- Xray abdomen (supine and erect)- double bubble sign of gastric and proximal duodenum dilatation with "paucity of gas" in rest of abdomen.
- Contrast study- look for DJ loop which is normally to the left of the spine but in malrotation it is on the right side of the spine "coil spring" appearance of dilated duodenum. Small bowel is in the right half of abdomen and large gut on left side of abdomen.

Plain X Ray



Contrast Study



diagram



- Color doppler study- dilated duodenum with inversion of superior mesenteric artery and vein position with whirlpool sign.
- CT Scan if required also gives same findings as on ultrasound.

Management

Patient should be aggressively resuscitated and operated upon as early as possible. Operation done-

- Open laparotomy
- Laparoscopy procedure

Open laparotomy steps:

- 1. Right upper abdominal transverse incision
- 2. Derotation of gut in midgut volvulous
- 3. Division of Ladd's Bands
- 4. Broadening of small bowel mesentry
- 5.Straightening of DJ loops
- 6.Appendicectomy
- 7. Rule out internal duodenal obstruction

8.Placement of small bowel on right side of abdomen and large bowel on left side known as foetalization of gut.



THANKS