

WHEN EMBRYOLOGY PRESENTS IN ADULTHOOD: GUT MALROTATION CAUSING ACUTE INTESTINAL OBSTRUCTION IN A 32-YEAR-OLD GENTLEMAN

BY

Dr. Kshitij prakash, Dr. Rathindra Tripura and Dr. Swachchha Shubham

Department of General Surgery, Rama Medical College, Hospital and Research Centre, Hapur, UP.

ABSTRACT

Malrotation of the gut is a common paediatric condition that usually presents in the first month of life. However, presentation in adults is rare, and as a diagnostic dilemma quite often surprises the surgeon intraoperatively. If this condition is not timely recognized, it may result in disastrous consequences, such as gangrene of the small gut. We present the case of a 36-year-old male who presented to the emergency room with recurrent episodes of colicky abdominal pain and bilious vomiting. Contrast-enhanced computerized tomography (CT) revealed malrotation of the gut. The patient was planned for Ladd's procedure. Malrotation in adults may present in an acute way due to midgut volvulus or may have a chronic indolent course with recurrent vomiting and abdominal pain. In patients with acute obstruction, this differential should be kept in mind, especially if the patient has no previous abdominal surgery or evidence of tuberculosis. Contrast-enhanced CT is the investigation of choice and reveals typical findings, like whirlpool sign, corkscrew sign, or reversed relation of superior mesenteric artery and vein. The treatment is surgical as failure to do so may result in intestinal gangrene. The procedure of choice is Ladd's procedure. Every patient, even if asymptomatic, warrants this procedure as it is impossible to predict the timing of catastrophic complications.

Keywords: malrotation, adults, obstruction, ladd's procedure, whirlpool sign, corkscrew sign

INTRODUCTION

Intestinal malrotation is a clinical entity that encompasses partial to complete failure of the 270 degrees' counterclockwise rotation of the midgut around the superior mesenteric vessels in the fetal life [1]. Its incidence is one in every 200 - 500 newborns [2]. The incidence of symptomatic cases is one in 6,000 newborns [2]. Presentation in adults is very rare. A high index of suspicion is often necessary to diagnose this condition in adults. Keywords: Malrotation gut, Ladd's procedure, post operative,

A congenital defect known as malrotation arises when the intestine fails to fully rotate along the superior mesenteric artery's axis during the embryonic developmental. This anomaly usually presents in the first month of life and is a rare presentation in 32 year old gentleman¹⁻²

Midgut volvulus is the most common clinical manifestation in adults, frequently self-limiting and recurring but sometimes contributing to an abdominal crisis. These are different types of midgut malrotation, (i) non-rotation (ii) incomplete rotation (iii) reverse rotation (iv) anomalous fixation of mesentery⁴⁻⁵.

The interventional approach is surgery. Ladd's procedure is the preferable approach⁶⁻¹⁰.

Successful diagnosis and effective management to the patient at our institution periodically as per norms.

SCENARIO

A 32-year-old gentleman came to the emergency Department with complaint of

- Diffuse abdominal pain since 2 days
- Not passed stool since 2 days
- Vomiting since 1 day

HISTORY OF PRESENT ILLNESS

Patient was apparently asymptomatic 2 days back then he complained of sudden onset of pain around umbilical region which progressed into diffuse abdominal pain. It was initially colicky in nature and persistent throughout the day. It was also associated with vomiting since 1 day. He had 3 episodes of vomiting containing water and food he consumed earlier as vomitus. He also complained of not passing flatus and stool since 2 days.

PAST HISTORY

- Medical history:
No significant past history of any chronic illness.
No history of similar complaints in the past.
- Surgical history:
He had open mesh hernioplasty for epigastric hernia in the same month.

Family history: No significant family history.

PERSONAL HISTORY

- Mixed diet
- Normal sleep cycle
- No history of alcohol/smoking.

GENERAL EXAMINATION

Patient was examined with consent in a well-lit room in supine position.

Middle-aged man, moderately built and nourished. Alert, cooperative and well oriented to time, place and person.

Pallor –ve

Icterus –ve

Cyanosis –ve

Clubbing –ve

Lymphadenopathy –ve

VITALS

BP – 110/70 mmHg

PR – 120 bpm

SpO₂ – 96% at RA

Temperature – Afebrile

SYSTEMIC EXAMINATION: ON ABDOMINAL EXAMINATION

Inspection: Abdomen was distended. Umbilicus is central and inverted. Scar present in supraumbilical region. All the quadrants of abdomen were moving equally with respiration.

Palpation: On superficial palpation, temperature is normal all over the abdomen. Abdomen was tense and distended and diffuse tenderness was noted. Guarding was present.

Percussion: No shifting dullness/fluid thrill was present.

Auscultation: Bowel sounds were absent.

CVS: S1 S2 +

CNS: Conscious and oriented to time, place and person.

Respiratory system: B/L air entry present, no added sounds.

SUMMARY OF THE CASE

A 32year old gentleman presented with complaints of diffuse abdominal pain and was not able to pass flatus nor stool since 2 days and had multiple episodes of vomiting since day 1. On examination, abdomen is distended and guarding is present.

PROVISIONAL DIAGNOSIS

A 32year old gentlemen presenting with diffuse abdominal pain, vomiting and not passed flatus nor stool in most likely case of

INTESTINAL OBSTRUCTION

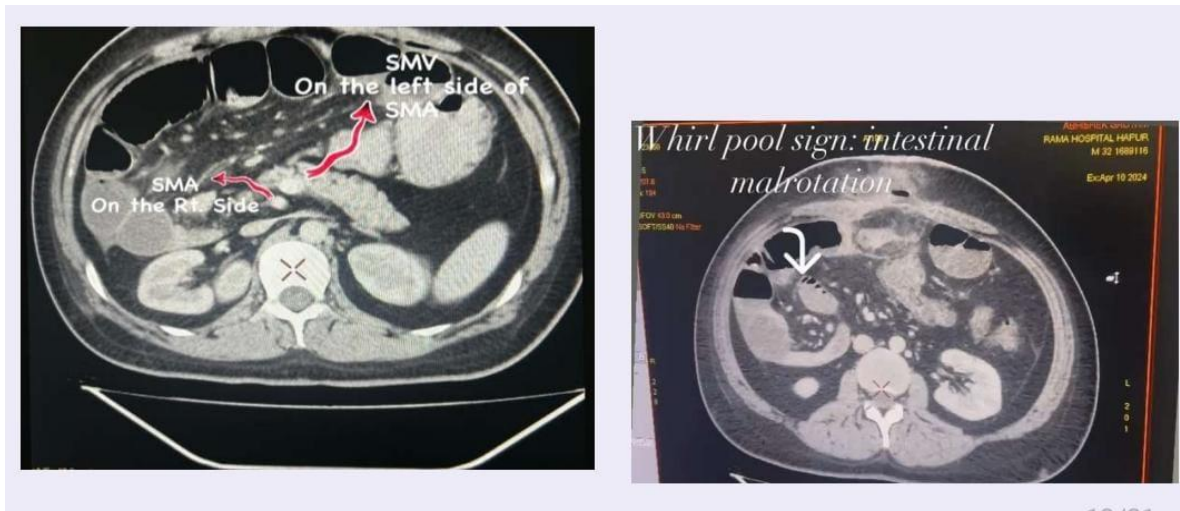
INVESTIGATIONS

- CBC, LFT, KFT, RBS
- USG (W/A)
- X-RAY Abdomen: Supine and erect
- CECT (W/A)

FINDINGS OF INVESTIGATIONS DONE

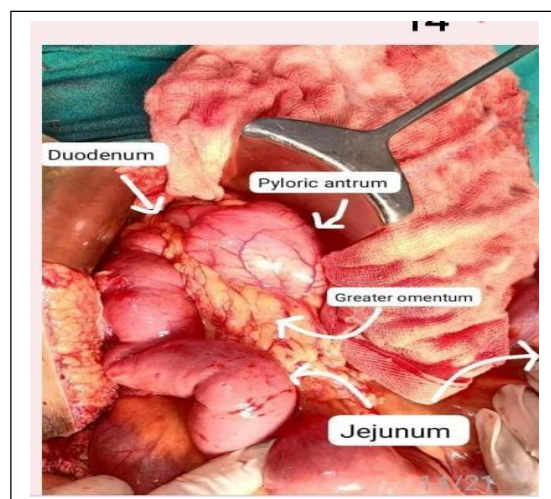
- TLC was raised.
- On X-RAY Abdomen: Multiple air-fluid levels were present.
- On CECT (W/A):
 1. Small bowel obstruction involving duodenum and jejunum.
 2. Mild intra-abdominal fluid collection in the epigastric region beneath the operative site.
 3. Intestinal malrotation with reversal of SMA-SMV relation.

CECT FINDINGS



MANAGEMENT

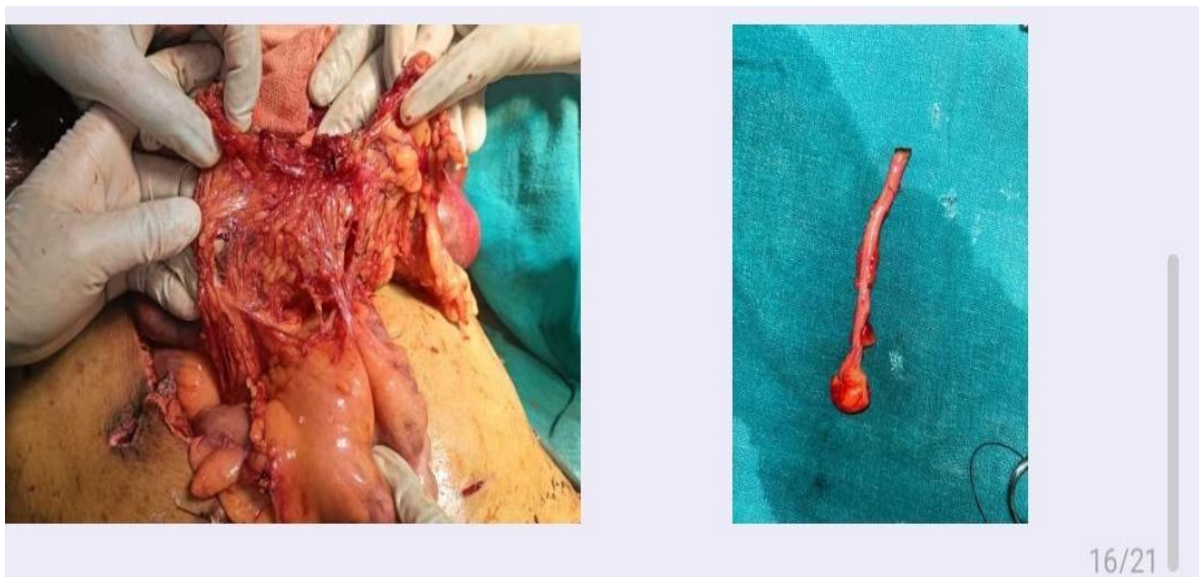
- NPO
- Intravenous fluid replacement
- Antibiotics
- Pain killer
- Nasogastric tube placement
- **Surgical Management:** Ladd's procedure



INTRA OPERATIVE FINDINGS: LADD'S BAND



INTRA OPERATIVE FINDINGS



OVERVIEW OF THE CASE

The diagnosis of malrotation of the gut was made as per CT findings, and the patient was planned for urgent surgery.

Typical findings of malrotation were seen intraoperatively: small bowel loops predominantly on the right side of the abdomen, hiding the colon, and the DJ flexure not crossing the midline and remaining to the right of the midline.

Ladd's procedure was performed.

The postoperative period was uneventful and the patient was discharged on day 8. The patient has been doing well for the last one month and is totally symptom-free.

Ladd's procedure consists of the following steps:

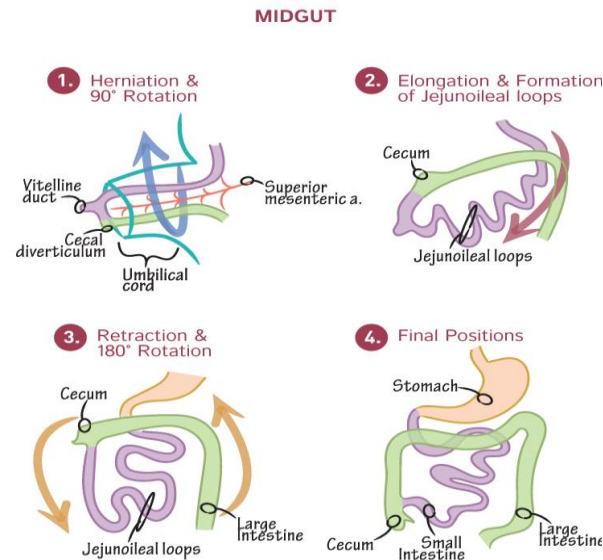
- Delivery of the small bowel and untwisting it counter-clockwise, placing the caecum in the right paravertebral gutter with the bands clearly visible which are divided.
- Kocherization and widening of the small bowel mesentery, and finally, concluding with an appendectomy.

- This procedure places the small gut and duodenum on the right side and the large gut on the left.
- In situations where gangrene has developed, resection of the bowel becomes mandatory.

ROTATION OF GUT:

The midgut loop rotates around the axis of superior mesenteric artery, it makes a rotation of 270° in counterclockwise direction.

The total rotation of midgut can be divided into three stages of each 90° . First 90° rotation occurs during the herniation and the remaining 180° during the return of intestinal loop into the abdominal cavity.



NORMALLY

- The **Small intestine** lies toward the **left** side of the abdominal Cavity and the **Large Intestine** lies towards the **right**.
- on CT:SMV is always right of the SMA.

DISCUSSION

Malrotation of the gut is the complete or partial failure of 270° of counterclockwise rotation of the midgut around the superior mesenteric pedicle. The rotation of the intestines in the embryonic period occurs in three stages [3]:

* Stage 1: Occurs between five to 10 weeks. This involves herniation of the midgut into the umbilical cord, 90-degree counterclockwise rotation and return into the fetal abdomen. • Stage 2: Occurs in week 11 and involves further rotation till 270° in the abdominal cavity. • Stage 3: Involves fixing of the mesentery.

Malrotation in adults is rare and occurs with obscured clinical symptoms, such as recurrent abdominal pain and vomiting, often resulting in multiple hospital visits and posing a diagnostic dilemma to the unpolished surgeon [4-5]. This condition may also present in an acute way, due to midgut volvulus, and may result in intestinal ischaemia and gangrene. The consequences of this are disastrous and often result in massive bowel gangrene, death, and short bowel syndrome if the patient survives. Timely recognition of the condition is the key to survival [5]. A high index of clinical suspicion is necessary, especially in patients with recurrent episodes of abdominal pain and bilious vomiting, no previous surgical history, and no evidence of tuberculosis. Plain abdominal radiographs are not useful and the investigation of choice in adults remains a contrast-enhanced CT scan [5]. The typical findings are reversed relation of superior mesenteric artery (SMA) and superior mesenteric vein (SMV), a whirled appearance of the vasculature entering the volvulus (whirlpool sign), small bowel loops in the right upper abdomen, a lack of visualization of the caecum in the right iliac fossa, dilatation of various duodenal loops, and duodenojejunal flexure to the right (corkscrew sign). The typical reversed relationship of superior mesenteric vessels can be seen on ultrasonography as well. All patients, regardless of age, should undergo surgery as it is impossible to predict the development of catastrophic

complications [5]. The procedure of choice is the Ladd's procedure, be it in elective or emergency settings. This procedure can be performed by a laparoscopic approach as well [5]. This procedure consists of the following steps: delivery of the small bowel and untwisting it counter-clockwise, placing the caecum in the right paravertebral gutter with the bands clearly visible which are divided, kocherization and the widening of the small bowel mesentery, and finally, concluding with an appendectomy. This procedure places the small gut and duodenum on the right side and the large gut on the left. In situations where gangrene has developed, resection of the bowel becomes mandatory.

CONCLUSIONS

A high index of suspicion is needed to diagnose malrotation of the gut in adults. This condition should be suspected in patients with recurrent episodes of abdominal pain and bilious vomiting with no history suggestive of tuberculosis or any history to support an adhesive cause. In the emergency setting, an ultrasound looking for the reversed relation of superior mesenteric vessels can be very useful. Timely diagnosis will prevent the deadly complications of this disease.

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