



## Subacute Duodenal Obstruction Secondary to Anomalous Reverse Rotation of Midgut in Adulthood - A Case Report.

Dr.M.Thiyagaraj Lakshmi Seshadri<sup>\*,3</sup>, Dr.V.Kopperundevi<sup>1</sup>, Dr.G.Vimala<sup>2</sup>,  
Dr.R.Kannan<sup>4</sup>.

1.Institute of General Surgery, RGGGH & MMC, Chennai 03, Tamilnadu, India.

2.Institute of General Surgery, RGGGH & MMC, Chennai 03, Tamilnadu, India.

3.Institute of General Surgery, RGGGH & MMC, Chennai 03, Tamilnadu, India.

4.Institute of General Surgery, RGGGH & MMC, Chennai 03, Tamilnadu, India.

Submitted: 15-04-2022

Accepted: 30-04-2022

### ABSTRACT:

Midgut malrotation represents a spectrum of disorder with varying clinical presentation ranging from acute ischemic volvulus to chronic intestinal obstruction. The most common clinical presentation is acute intestinal obstruction resulting from the midgut volvulus which usually occurs in the neonatal period. It is uncommon for these congenital anomalies to remain unnoticed for a considerable period of time without causing any obvious symptoms and to be detected in the adolescence or early adulthood, either incidentally or due to development of new symptoms. Based on the degree and direction of the rotation of the midgut, the malrotation variants may be classified into non-rotation, partial rotation or reverse rotation. Hereby, we present a case of 19 year old boy presenting clinical features of subacute progressive upper gastrointestinal obstruction diagnosed to have a reverse rotated variant of the malrotation managed by Ladd's procedure

### Key words:

malrotation, midgut, reverse rotation, duodenal obstruction.

### Declarations:

**Consent from patient:** Obtained.

**Consent for Publication:** Obtained

**Conflict of interest:** None.

**Ethical Committee Approval:** Not required.

**Funding:** Nil.

### I. INTRODUCTION:

The term midgut malrotation refers to all the anomalies arising out of incomplete, non-rotation or reverse rotation of midgut and fixation to retro-peritoneum. (1) Midgut malrotation are known to be associated with other anomalies in such as heterotaxia (40 % -90%), congenital diaphragmatic hernia, anterior abdominal wall defects, duodenal atresia, duodenal webs and

mesenteric cysts. (2) Acute forms are usually seen in the neonatal period and infancy, while the chronic forms will be seen in older child. Reverse rotation is a rare variant in which the midgut loop rotate in clockwise direction with respect to superior mesenteric axis instead of normal anti clockwise direction. In reverse rotation, the transverse colon lies in the retro arterial tunnel posterior to superior mesenteric axis and the symptoms may arise due to compression of transverse colon (causing acute or chronic colonic obstruction) or kinking of duodenum by Ladd's band (causing duodenal obstruction) or volvulus of midgut. (3) Malrotation are usually diagnosed by upper gastrointestinal contrast studies. Ultra sonogram may be useful in some cases. (4)

### II. CASE REPORT:

**History:** A 19 year old boy presented to the emergency department with history of recent onset, gradually progressive, bilious vomiting for past 35 days which was initially for solid diet, later for both solid and liquid diet. He was apparently normal before 35 days. History of loss of appetite, significant loss of weight, easy fatigue, reduced urine output, constipation was present. History of abdominal distention, ball rolling movements, abdominal pain, jaundice and foreign body ingestion was absent. The boy had no prior history of similar illness or surgeries, no known medical comorbidities, no drug allergies and no known family members affected by similar illnesses.

**Examination:** Patient was conscious, oriented, afebrile, dehydrated, thin built and malnourished, pale, not icteric, Body Mass Index - 15 kg/m<sup>2</sup>.

**Vitals:** Blood pressure - 90/60 mm Hg, pulse - 136/min, temperature - normal, respiratory rate - 20/min.

**Per abdomen examination: Inspection:** scaphoid, umbilical normal, no dilated veins, no mass nor visible gastric peristalsis, flanks free, normal



external genitalia. **Palpation:** soft, non-tender, no evidence of mass or organomegaly, skin turgor decreased. **Percussion:** no free fluid. **Auscultation:** bowel sounds absent. **Digital rectal examination:** normal  
**Investigations:** Complete haemogram revealed anaemia, renal function test was deranged suggesting pre-renal acute kidney injury, serum electrolytes estimation revealed hypokalemia, arterial blood gas analysis revealed metabolic

alkalosis. coagulation profile and liver function tests were within normal limits. The patient was resuscitated, hydrated, dyselectrolytemia corrected and renal function optimized. Contrast enhanced tomography revealed possible transition point at duodenum with reversal of superior mesentric axis. Upper Gastrointestinal endoscopy was inconclusive with copious bilious content in the distended proximal duodenal.

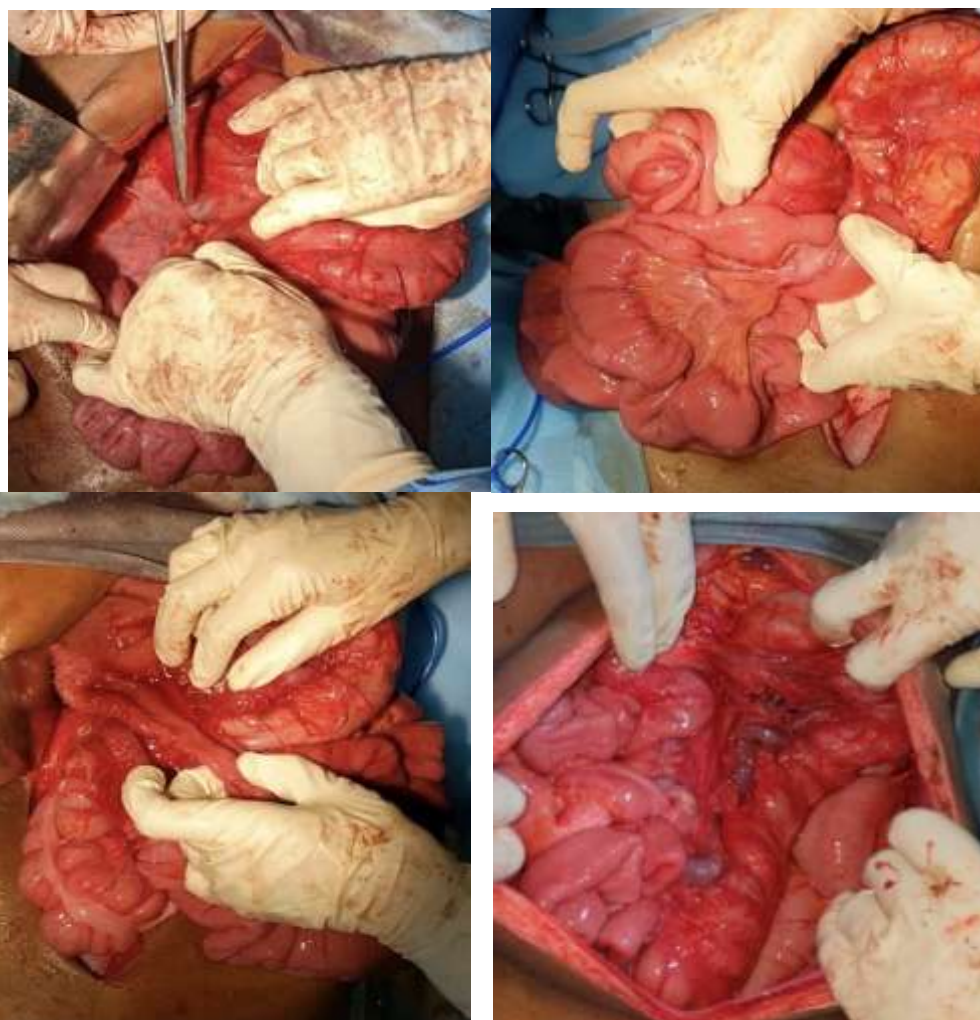


**Figure1: Contrast Computer Tomogram showing reversal of superior mesentric axis with distended stomach and first part of duodenum**

#### **Operative procedure:**

Exploratory laparotomy revealed a transition point at the third part of duodenum with distended stomach and collapsed jejunum and entire colon. Duodenum was ante-colic. Ladd's band was present between the duodenum and right para-colic gutter causing kinking of the third part of duodenum. Most of the loops of jejunum and ileum was in the right iliac fossa with long narrow mesentery and dilated mesenteric vessels, twisted on itself to form a chronic volvulus with no evidence of gangrenous bowel. Ascending colon was short and sub-hepatic appendix. Transverse colon was traversing from right to left through a retro-duodenal tunnel. Duodenum was anterior to the superior mesentric axis and transverse colon was posterior thereby forming a reverse rotation variant. Rest of the left colon was normal.

Proceeded with Ladd's procedure. Adequate adhesiolysis done. Ladd's band released. Transition point released from kinking, detorsion of small bowel done without interrupting the blood supply, adequate mobilisation of small bowel, and right colon done, broadening of small bowel mesentery, done, transverse colon brought out of the retro-duodenal tunnel by pulling the right colon and entire small bowel loops through the tunnel from right to left without resection of bowel segments. Appendicectomy done, Ryle's tube advanced into jejunum to rule out any webs/stenosis, small bowel loop placed in right side, mobilised ascending and transverse colon in the middle and uninvolved descending colon in the left side of abdominal cavity. Suture fixation of bowel to lateral abdominal wall is not done. Postoperative period was uneventful.



**Figure 2a: showing Ladd's band, 2b chronic volvulus of small bowel in right lower quadrant, 2c retro duodenal transverse colon, 2d post Ladd's procedure showing small bowel in right side and large bowel in left side.**

#### **Follow up and outcome:**

Patient is now being followed for 10 months. No evidence of recurrent obstruction till now. Patient is tolerating normal diet and showed adequate weight gain and improvement in nutritional status.

#### **III. DISCUSSION:**

Unlike stormy pediatric presentation, the midgut malrotation in adulthood presents with variable manifestation such as chronic, indolent and asymptomatic forms. Most common presentation is intermittent bilious or non bilious vomiting seen in upto 30% of patients. Other symptoms includes abdominal pain 20%, failure to thrive, malabsorption and chronic diarrhoea. May of these symptoms are attributed due to self limiting, intermittent obstruction. Only 10 to 15 % presents with acute manifestation.(4) Malrotation have been reported to be detected incidentally

while performing laparotomy of other indication such as appendicectomy. The general consensus is that a corrective surgical procedure is indicated in all the patients irrespective of the symptoms and age at which diagnosed due to potential risk of bowel ischemia.(5) Sushant et al reported a case of reverse rotation in a 25 year old male, treated by transection of distal ileum and transverse colon followed by right hemicolectomy with side to side anastomosis anterior to duodenum. (6) Stephan Dreyer et al reported a case of 73 year old female with volvulus of ileum around vitelline duct remnant in whom the reverse rotation of midgut was also associated on exploratory laparotomy. This case was treated by resection of volvulus segment of small bowel. Reverse rotation of midgut was not correct surgically and transverse colon was left insitu in retro duodenal position.(7) Sankara Narayanan Narayanaswamy et al reported a case of 25 year old female presented with reverse



rotation of midgut with small bowel volvulus treated by detorsion of small bowel and retro duodenal transverse colon was left in the retro duodenal tunnel undisturbed.(8) Inversion appendectomy are preferred by some surgeons who do not want contamination of sterile fields.(9) Suture fixation of bowels is not recommended in view of precipitation of internal hernia or post operative bowel obstruction. Mortality and morbidity upto 25% and 60 % have been reported in patients who present with acute symptoms. Patient may have delayed gastric empty or prolonged postoperative paralytic ileus due to chronic obstruction and are usually managed conservatively.(10,11) Following Ladd's patients have a lifetime risk of 15% small bowel obstruction.(12) Risk of recurrent volvulus is upto 8% as the surgery does not completely eliminate the risk of volvulus.(13)

#### IV. CONCLUSION:

Though not common, atypical presentation of malrotation can be seen in adulthood and the surgeon should have adequate knowledge and expertise before making appropriate decisions. Associated abnormalities like diaphragmatic hernia, abdominal wall defects, duodenal atresia, webs, cardiac anomalies should be searched for and treated. Prognosis depends on the degree of associated abnormalities as chronic variants of malrotation have good prognosis per se. Non resection with anterior transposition with extensive mobilization of right colon and duodenum is an effective alternative to the resection, transposition and anastomosis of transverse colon in reverse rotation. Further studies are needed to guide appropriate action in these rare variants of malrotation.

**Consent from patient:** Obtained.

**Conflict of interest:** None.

**Ethical Committee Approval:** Not required.

**Funding:** Nil.

#### REFERENCES:

- [1]. Alani M, Rentea RM. Midgut Malrotation. [Updated 2021 Aug 1]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-.
- [2]. Graziano K, Islam S, Dasgupta R, et al. Asymptomatic malrotation: Diagnosis and surgical management: An American Pediatric Surgical Association outcomes and evidence based practice committee systematic review. *J Pediatr Surg* 2015; 50:1783.
- [3]. *Ann R Coll Surg Engl*. 2010 Oct; 92(7): e3–e5. Published online 2010 Oct. doi: 10.1308/147870810X12822015504446
- [4]. Devlin HB, Williams RS, Pierce JW. Presentation of midgut malrotation in adults. *Br Med J* 1968; 1:803.
- [5]. Durkin ET, Lund DP, Shaaban AF, et al. Age-related differences in diagnosis and morbidity of intestinal malrotation. *J Am Coll Surg* 2008; 206:658.
- [6]. Balamoun H, Mohammad R, Hamade A. Reversed rotation of the midgut in adults--a case report. *Ann R Coll Surg Engl*. 2010;92(7):W3-W5. doi:10.1308/147870810X12822015504446
- [7]. Dreyer S, Kaczynski J, Hrobar P, Collins P. Reverse intestinal rotation: a rare case of volvulus around a vitelline duct remnant. *BMJ Case Rep*. 2014;2014:bcr2014204107. Published 2014 Sep 22. doi:10.1136/bcr-2014-204107
- [8]. NARAYANASAMY, Sangara Narayanan; MANOHARAN, G. V.; PADMANABAN, Naveen. Reverse rotation of gut with small bowel volvulus. *International Surgery Journal*, [S.l.], v. 2, n. 2, p. 295-299, dec. 2016. ISSN 2349-2902. Available at: <<https://www.ijdsurgery.com/index.php/isj/article/view/598/596>>. Date accessed: 19 feb. 2022.
- [9]. Voeller GR, Fabian TC. Inversion-ligation appendectomy for incidental appendectomy. *Am J Surg*. 1991 Apr;161(4):483-4. doi: 10.1016/0002-9610(91)91118-3. PMID: 2035769.
- [10]. Hsu SD, Yu JC, Chou SJ, et al. Midgut volvulus in an adult with congenital malrotation. *Am J Surg* 2008; 195:705.
- [11]. Kotobi H, Tan V, Lefèvre J, et al. Total midgut volvulus in adults with intestinal malrotation. Report of eleven patients. *J Visc Surg* 2017; 154:175.
- [12]. Lin JN, Lou CC, Wang KL. Intestinal malrotation and midgut volvulus: a 15-year review. *J Formos Med Assoc* 1995; 94:178.
- [13]. Fonkalsrud E. Rotational anomalies and volvulus. In: *Principles of Pediatric Surgery*, O'Neill JA, et al (Eds), Mosby, St. Louis 2003. p.477.