



Abdominal Pain - A Twist In Gut -In Adults: Institutional Study

Dr Boyidi Venkata Raju¹, Dr Namburi Pavani², Dr. Venkata Sri Harshini Tummala², Dr. Bollamreddy Lokesh², Dr. Bodapudi Ganesh², Dr. Mugidi Sai Prasanna Kumar Naidu², Dr Samir Ranjan Nayak³

¹Assistant Professor, ²Resident, ³Professor,

Department Of Surgery, GSL Medical College, Rajahmundry, Andhra Pradesh

***Corresponding Author:**

Dr. Samir Ranjan Nayak

Professor, Department Of Surgery, GSL Medical College, Rajahmundry, Andhra Pradesh

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Abstract

Objective: The work aimed was to study the various presentations, diagnostic evaluation, and management of malrotation of the gut in adults older than 20 years of age.

Materials and Methods: Hospital records of post operated patients with the diagnosis of malrotation of gut over the last 5 years older than 20 years were evaluated retrospectively.

Results: The study population included 5 cases with all the above age 20 years. Four patients presented with nonspecific upper abdominal pain with occasional vomiting. One case presented with acute small intestinal obstruction and was diagnosed to have malrotation intraoperatively. Contrast Enhanced Computerised Tomography (CECT) revealed the diagnosis as malrotation of gut preoperatively in 3 cases. All elective 4 cases underwent a standard laparoscopic Ladd's procedure. Midgut volvulus with gut malrotation was diagnosed intraoperatively for the patient who underwent emergency surgery. In all the cases, the small bowel was inside a sac-like structure. There was no mortality in the present study.

Conclusion: Malrotation should be suspected in patients with chronic abdominal symptoms, Diagnostic laparoscopy may be performed for recurrent chronic abdominal pain if malrotation is suspected. Surgical correction is mandatory to avoid midgut volvulus.

Keywords: Malrotation; Upper abdominal pain, CECT, Diagnostic laparoscopy, Ladd's procedure;

Introduction

Intestinal malrotation is an anomaly that results from abnormal or incomplete rotation of the intestines around the axis of the superior mesenteric artery during embryonic development [1]. The ligament of treitz is not formed, distal duodenum and jejunum are aligned on the right side of columna vertebralis [2]. Midgut rotation arrest is due to the narrow-based mesentery that increases the risk of twisting of midgut those results in obstruction and necrosis [3]. It consists of a spectrum of abnormalities ranging from nonrotation to incomplete rotation to typical malrotation. The true incidence in adults is difficult to estimate as most will remain asymptomatic [4].

Many are recognized only intraoperatively during other procedures or in an emergency with intestinal obstruction [3, 4]. Patients who are symptomatic often present with intermittent colicky pain and bile-stained vomiting or with bowel obstruction or chronic abdominal pain [4]. These symptoms are caused by peritoneal bands first described by Ladd, which run from the cecum to the right lateral abdominal wall [3, 4]. The vague symptoms are attributed to psychogenic causes, gastrointestinal allergies, or milk intolerance [5]. The inconstant presentations in adults, and limited awareness of the condition among clinicians, may lead to delays in diagnosis and treatment.

Materials and Methods

This retrospective study was done in the Department of Surgery at GSL Medical College and General Hospital, Rajahmundry, Andhrapradesh, India. Patients above the age of 20 years with a diagnosis of intestinal malrotation at the time of discharge were included in the study group. Data collected from February 2015 to January 2022 were included in the study group. The diagnosis was established on Contrast -Enhanced CT (CECT) or incidentally during the surgery (diagnostic laparoscopy /laparotomy). Radiological diagnosis of malrotation was asserted when there was a lack of a duodenal C-loop, and the duodenojejunal junction had not crossed the midline and/or not ascended to the level of the pylorus or malposition of SMA/SMV. Malrotation was defined as “typical” if the duodenojejunal junction was to the right of the

midline and “atypical” when it was on the left side but not ascended to the level of the pylorus. Surgical findings of malrotation included the presence of ligament of Treitz at the abnormal position, the presence of Ladd bands, presence of small bowel loop in a sac, and the presence of a narrow mesenteric root. A total of 5 patients were managed for malrotation of the gut. Data were obtained from the hospital medical record department, which provides information about the age at presentation, sex, presenting symptoms, significant past history, radiological investigations performed, intraoperative details, complications, and postoperative care. All elective cases were done under laparoscopy video recording retrieved and reviewed.

Results

Demography, The study population, included 5 adults, 2 female and 3 male (table 1)-

Table 1: Age and Sex Data Of Cases

Case no	Age years	sex
1	22	FEMALE
2	33	MALE
3	28	MALE
4	38	MALE
5	25	FEMALE

Clinical presentations (Table- 2) show various clinical presentations of the patients in this study.

Table 2: DETAILS OF PATIENTS CLINICAL PRESENTATION AND PAST HISTORY

Case no	Clinical presentation	Past history	clinical examination findings
1	Pain in the upper abdomen, bilious vomiting occasionally abdominal distension more on after taking food- for 1 year	H/o recurrent abdominal pain Admitted twice as diagnosis of acute gastritis	soft, no tenderness, no organomegaly
2	Recurrent upper abdominal pain, periumbilical pain, no vomiting. 1 year	H/o hospital admission for? appendicitis	Soft abdomen, Mild tenderness periumbilical region

3	recurrent upper abdominal pain, pain radiating to back,	Recurrent abdominal pain	No abnormal findings
4	Retrosternal discomfort, Pain in the epigastric region	On psychiatric treatment for the pain abdomen	Normal
5	Acute abdominal pain, vomiting, distension, obstipation	H/o recurrent abdominal pain from childhood. used various medications	shock, distended abdomen, diffuse tenderness, and rigidity, guarding

4 patients had atypical presentations like recurrent vague abdominal pain, postprandial pain, upper abdominal fullness, nonbilious and vomiting mimicking appendicular pathology or pancreatitis,. X-ray chest and abdomen were unremarkable in all of these patients.

Table 3-provisional diagnosis and imaging

case	diagnosis at the time of admission	X-Ray abdomen	USG abdomen	endoscopy	CECT abdomen
1	peptic ulcer disease	normal study	normal	non-erosive gastritis	Malrotation of the GUT.
2	chronic appendicitis	Normal study	appendix 5 mm in diameter,	normal	not done diagnostic lap DJ flexure on right side
3	chronic pancreatitis	normal	normal study	dilated stomach with patulous pylorus	malrotation of gut with dilated stomach
4	Irritable bowel syndrome	normal	pancreas normal	Endoscopy and colonoscopy normal	malrotation of the GUT
5	acute intestinal obstruction with peritonitis with shock	few dilated bowel loops	dilated bowel loops with sluggish peristalsis	endoscopy not done	CECT has done postoperatively to confirm the diagnosis- abnormal position of SMA and SMV

The ultrasonography abdomen was normal in all elective cases. Endoscopy and colonoscopy added no extra benefit to the diagnosis. CT abdomens with contrast study in 3 cases were suggestive of gut malrotation. CECT revealed abnormal relationships of the superior mesenteric artery and vein (FIG 1, 2). In one case, diagnostic laparoscopy was done for chronic abdominal pain with suspicion of appendicular pathology. On the diagnostic lap, the appendix was normal, but to the surprise, clumped bowel loops in a sac and DJ flexure was found at the right side. One case in the study group was admitted on emergency and was diagnosed to have midgut volvulus with malrotation of the gut intraoperatively. There were no other associated congenital anomalies in any of these patients.

Figure 1:

CECT: showing the abnormal position of SMA and SMV

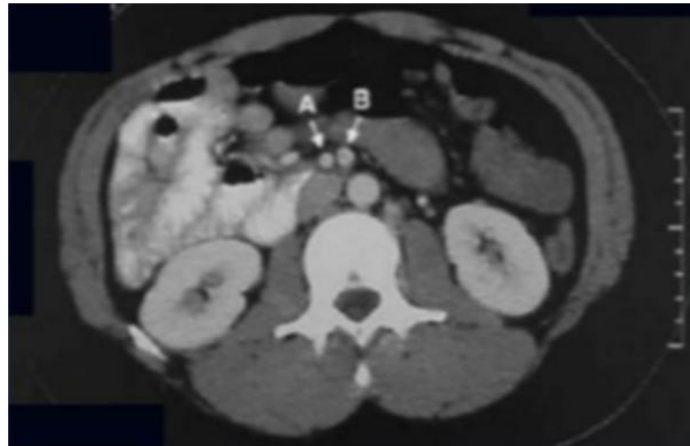
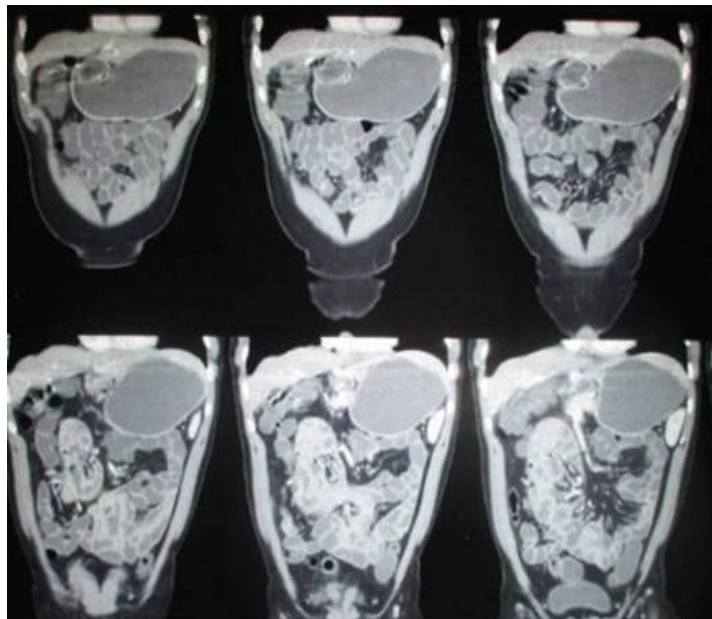


Figure 2: contrast CT-Dilated stomach, clumped bowel loop right side, DJ junction at the right side



Surgical management: In three cases, the diagnosis of malrotation was confirmed preoperatively. One case was diagnosed during routine laparoscopy. In all 4 cases, the clumped viable bowel loop was on the right side within a sac, with DJ flexure on the right side. All 4 cases underwent a standard laparoscopic Ladd's procedure with the opening the sac, de-rotation of bowel, division of the Ladd's bands, broadening of the mesentery, appendectomy, and placement of the bowel in a non-rotated orientation (Fig 4, 5). Midgut volvulus was present in one case in an emergency with intraop findings of gangrenous bowel within the sac (fig-6,7). On exploration,

DJ flexure was on the right side. Resection of the gangrenous segment (ileum, appendix, cecum, ascending colon, proximal transverse colon) and jejunocolic anastomosis was done. Postoperative CECT was done to confirm the diagnosis. Duration for the resumption of oral intake and time to discharge were shorter for all four patients as they were operated laparoscopically. Symptoms were completely relieved in all 4 cases. The case where resection of the bowel was done developed nutritional disturbances. There was no mortality in this study

Fig 3- Clumped Small bowel in a sac on right side Abdomen.

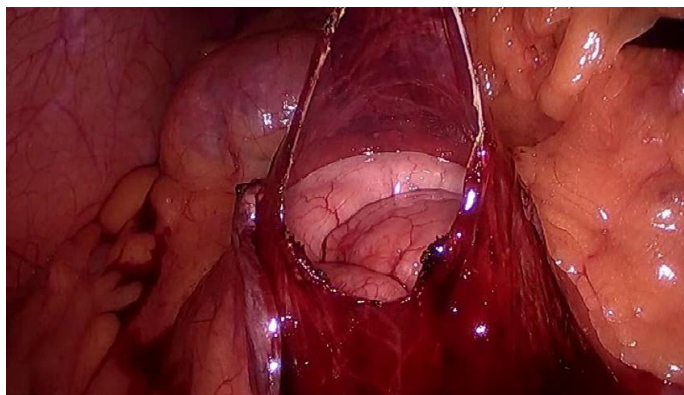


Figure 4-- -laparoscopy view, twisted small bowel



Figure5- Laparoscopic view, Ladd's band

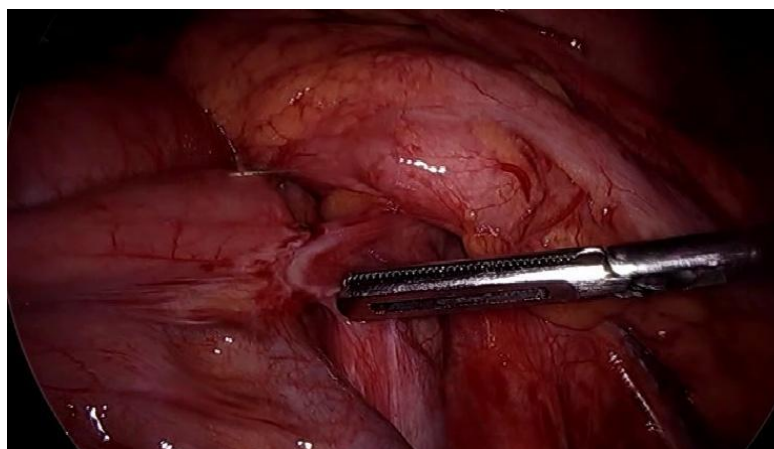


Figure 6- Emergency laparotomy—midgut volvulus



Figure 7- after opening sac- gangrenous bowel inside the sac



Discussion

Congenital anomalies of intestinal malrotation are often seen in infants and children; however, they are uncommon in adults above 20 years [6]. To understand intestinal rotation and its anomalies, knowledge of intestinal embryology is vital. The embryo's gut is in the form of a straight tube at the 4th week of life. During the 5th week, the vascular pedicle develops and the gut is divided into foregut, midgut, and hindgut [7]. The rotation of intestinal development has been divided into 3 stages. Stage 1 includes the extrusion of midgut into the extra embryonic cavity, 90-degree counterclockwise rotation, and return of the midgut into the fetal abdomen. Stage 2 involves the further counterclockwise rotation within the abdominal cavity completing 270-degree rotation. Stage 3 involves the fusion and anchoring of the mesentery. The cecum descends, and the ascending and descending colon

attach to the posterior abdomen [8]. The stringer classification states there are 3 forms of malrotation. Type 1 is non-rotation, Type 2 is duodenal malrotation and Type 3 is duodenal plus cecal malrotation [9]. In adult life, it may cause chronic but nebulous symptoms that are often difficult to diagnose. Adult presentations of malrotation can be broadly split into incidental, chronic, acute [10, 11]. The incidental presentation of malrotation often occurs in asymptomatic patients who undergo investigation of imaging and laparotomy for alternative health conditions. Chronic presentation of malrotation tends to be more insidious with symptoms such as postprandial bloating, intermittent cramping, and occasional vomiting. Symptoms can be vague and remitting over months or years [12]. In our study all the four patients presented with non-specific abdominal symptoms and on various medical management for pain. The acute presentations of

malrotation include the symptoms of intestinal obstruction like pain in the abdomen, vomiting, distension and absolute constipation. Intermittent volvulus or partially obstructing bands may cause these vague gastrointestinal symptoms, and a surgical correction is rewarding in these cases [9, 12]. In this study only one case presented with midgut volvulus with gangrene. Unfortunately, many patients are never referred to surgeons and are instead labelled as having functional disorders [6]. Adults with malrotation can present with vague abdominal complaints, recurrent intermittent cramping, nausea, and vomiting. Intermittent diarrhea, hematochezia, constipation, malabsorption, and weight loss may or may not be the clinical feature of gut malrotation [13].

Ultrasound abdomen has been discussed widely as an investigation in the diagnosis of malrotation, with the findings of inverse relation SMA and SMV [14]. In the present study, ultrasound did not reveal the malrotation, cause may be ultrasound in the teaching hospital was done by the junior residents. Endoscopy and colonoscopy added no extra benefit to the diagnosis. CECT abdomen is the standard investigation used for the diagnosis of malrotation of the gut. [15] In our study, three patients were diagnosed preoperatively with malrotation of gut by CECT abdomen and one patient was subjected to CT scan post-operatively to confirm our diagnosis

In some of cases intestinal malrotation is diagnosed incidentally during routine CECT /routine laparoscopy for other medical or surgical causes. There is also a subset of patients in whom intestinal malrotation is truly asymptomatic and is diagnosed incidentally during a laparotomy or laparoscopy done for other conditions such as gastric bypass or during imaging (computed tomography and magnetic resonance imaging) done for other medical issues. In our study also one case was diagnosed as appendicitis and diagnostic laparoscopy revealed malrotated gut

It is generally accepted that symptomatic patients with documented malrotation require surgical intervention. However, the management of patients with asymptomatic malrotation is controversial. In the study of Stewart *et al* 15% of all patients diagnosed as having malrotation were asymptomatic [16]. Operative treatment (Ladd's procedure) has been considered the standard therapy since its first

description in the 1930s. The principles of the Ladd procedure remain unchanged; however, the use of laparoscopy to diagnose or correct malrotation has been reported over the last 2 decades. Laparoscopy is useful in determining the position of the ligament of Treitz and also the fixity of the cecum. Palanivelu *et al* highlighted the value of laparoscopy in both diagnosis and therapy, especially in patients with acute abdomen symptoms with doubtful diagnosis, which warrant urgent surgery [17]

A laparoscopic Ladd's procedure has been shown to have low morbidity and can be safely accomplished in individuals with or without volvulus. Wang *et al* concluded that patients who underwent laparoscopic repair have experienced shorter hospital stays, fewer complications and decreased use of narcotics post operatively [18]. In our study, all elective 4 cases underwent standard laparoscopic Ladd's procedure. In the present study, preoperative symptoms are completely relieved on follow-up. On the contrary, Devane *et al* observed the persistence of gastrointestinal symptoms is common in patients with atypical presentation [19]. Intestinal dysmotility has been postulated for such symptoms.

Conclusion

Malrotation should be suspected in all patients presenting with varied acute or chronic abdominal symptoms. A contrast CT scan may be performed to rule out gut malrotation in patients with nonspecific abdominal pain. Surgical correction is mandatory to avoid mid-gut volvulus and intestinal obstruction in symptomatic malrotation patients, irrespective of the patient's age. Nevertheless, how to deal with the different atypical presentations of intestinal malrotation will continue to be puzzling both diagnostically and therapeutically. Perhaps, further studies based on laparoscopy as a diagnostic tool would help in formulating a policy for definitive management in such cases

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Informed Consent

Informed consent was taken from the patient and his relatives according to the declaration of Helsinki and his letter amendments

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