

## Segmental volvulus of small intestine: report of a case with an innovative method of surgery

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### Abstract

Intestinal malrotation is a general term used for any deviation from normal embryonic GI tract rotations. This abnormality, denotes a spectrum of conditions (non rotation, incomplete rotation) that according to the severity of anatomic consequence, can result in complications found in infancy, childhood, adolescence, adulthood or old age.

This article, reports another case of intestinal malrotation leading to acute midgut volvulus and intestinal obstruction with introducing a new surgical technique to prevent recurrent volvulus and a review of the literature.

**Keywords:** Intestinal malrotation, segmental volvulus, midgut volvulus.

### Introduction

Normal embryonic intestinal rotations were first described by Mall in 1898 [1]. In 1923, Dott, published the article about abnormalities of rotation and fixation with their surgical aspects [2]. Classic Ladd's procedure as an academic operative technique to treat midgut volvulus was introduced in 1936 by himself [3].

The true incidence of malrotation of the midgut is unknown because the spectrum of anatomic forms of malrotation includes minor derangements that predictably are asymptomatic and therefore undiagnosed [4]. The incidence of clinically symptomatic intestinal malrotation has been reported to occur 1 in 6000 live births [5].

Various clinical presentations, ranging from chronic abdominal pain to acute midgut volvu-

lus with ischemic bowel injury, may result from failure of normal intestinal rotation and fixation [6]. Most patients with midgut volvulus present in the first month of life [7]. The primary presenting sign of malrotation is the sudden onset of bilious vomiting in a previously healthy, growing infant [8].

The chronic intermittent or partial midgut volvulus is less frequent than acute one and leads to lymphatic and venous obstruction with enlargement of the mesenteric lymph nodes [9]. Recurrent abdominal pain is the cardinal manifestation of chronic midgut volvulus [10]. This form, is more common in children older than 2 years of age [11,12].

### Case report

A 11 years old boy was referred to our hospital because of colicky abdominal pain for past 3

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days. His pain began periumbilically, but at presentation was generalized. Bilious vomiting was the predominant accompanying symptom during these three days. He suffered from anorexia, and inability to pass gas and defecation 2 days after the onset of disease.

In the past the patient had experienced similar symptoms with less severity with spontaneous improvement, annually. No episode of hematemesis or melena was evidenced. No chronic diarrhea or constipation was found in patient's history.

His clinical examination was as follow: weight=27 kg, blood pressure=105/70 mmhg, pulse rate=100, respiratory rate=20, oral temperature=37.

The only significant physical findings were hyperactive bowel sounds and generalized abdominal tenderness without rebound tenderness. Nonetheless, organomegaly or abdominal mass were not found, and on rectal exam, the ampulla was completely empty of feces.

Lab data was as follow: WBC=5200 (poly=67%, lymph=26%, eos=1%) Hb=13, Plt=276000 U/A: WBC=0-1, RBC=0-1, Glucose=negative Protein=negative.

BS=94, BUN=30, Cr=0.8, Na=134, K=4.2.

Diffuse colonic gas paucity with edematous walls of small intestines was found in the abdominal x-ray examination, and intussusception was not present in abdominal ultrasonographic examination.

Patient was transferred to operating room with the initial diagnosis of intestinal obstruction after the IV hydration and NG tube insertion.

The abdomen was opened by midline laparotomy incision. On initial explore, no heterotaxia was found, but after complete search in the small intestines, a volvulus of 60 cm of the jejunum near the jejunoileal junction was discovered. The entire involved small intestine was congested and darkened in color but its viability was confirmed by inspection of peristaltic

movement and digital provocation. Intestinal detorsion was performed by counterclockwise rotation of 720 degrees (two full rotations). Therefore, after several minutes, normal color was returned in the intestine. A few large lymph nodes were found at the mesentery base, hence, excisional biopsy was accomplished from them. Typical Ladd's band was not found during abdominal exploration and no abnormal adhesion between small and large intestines was discovered. The derotated jejunum contained an interesting long and narrow-based mesentery in a manner that recurrence was highly probable to minimize this risk, an innovative mesenteroplasty was performed. During this procedure, a longitudinal incision was made on the mesentery and sewn horizontally. Therefore, a long narrow-based mesentery reshaped into short and widened base. Finally, incidental appendectomy was done because the cecum was in a position higher than the normal one and an incomplete intestinal rotation was vivid.

The patient proceeded to a very desirable and complication free postoperative period. The oral intake was restarted on the second postoperative day. He was discharged 3 days after the surgery and after 6 months of follow up, gained a complete normal and active life without any abdominal discomfort. Permanent pathology of mesenteric lymph nodes was reported as reactive lymphadenitis with normal appendix.

Discussion: Intestinal malrotation may cause duodenal obstruction with bilious emesis and sever abdominal pain in neonates[13]; may lead to chronic abdominal pain or chronic nonspecific abdominal symptoms in older patients due to intermittent volvulus or intermittent partial duodenal obstruction[14]; and may be demonstrated during contrast studies for nonspecific abdominal complaints or as an incidental finding during operation for unrelated reasons[15].

Intestinal malrotation may be diagnosed during prenatal period [16] or the diagnosis may be delayed until 80 years of age [17]. Even, it may cause gastric volvulus [18], pancreatitis[18],

obstructive jaundice [19], or the superior mesenteric vein thrombosis [20].

Nowadays, corrective surgery is suggested at any age but particularly in asymptomatic infants younger than 2 years of age who are at higher risk of developing volvulus [21]. Elective Ladd's procedure, has been supposed before volvulus occurrence in all of the diagnosed patients [22]. It has been performed laparoscopically in elective [23,24,25] and even emergent [26] situations.

Fixation of the duodenum or colon during the Ladd's operation, has been discouraged in the literature [27,28,29,30]. Widening of the mesenteric base has been recommended by dividing the Ladd's bands[15] carefully and completely to reduce recurrence rate. Some authors have advocated pexy of the cecum and duodenum but has not been demonstrated to have long term benefits[15].

Our innovative method to widen mesenteric base is an alternative which has been done successfully but must be studied in much larger scales and followed in long term to become popular.

## Conclusion

When intestinal malrotation leads to an acute midgut volvulus and intestinal obstruction, an alternative method that successfully performed in much larger scales with long term follow up is suggested along with a new surgical technique to prevent recurrent volvulus.

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