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Case Report

A rare case of Ladd's band causing duodenal occlusion in an adult with intestinal malrotation ☆☆☆

Dau Quang Lieu, MD^{a,1}, Tran Ngoc Dung, MD^{b,c,1}, Tran Bao Long, MD^{b,d},
Tran Ngoc Anh, MD^{a,e,1}, Luu Quang Dung, MD^b, Nguyen Minh Duc, MD^{f,*}

^a Department of Internal Medicine, Hanoi Medical University Hospital, Hanoi, Vietnam

^b Department of General Surgery, Hanoi Medical University Hospital, Hanoi, Vietnam

^c Department of Experimental Surgery, Hanoi Medical University, Hanoi, Vietnam

^d Department of General Surgery, Hanoi Medical University, Hanoi, Vietnam

^e Department of Internal Medicine, Hanoi Medical University, Hanoi, Vietnam

^f Department of Radiology, Pham Ngoc Thach University of Medicine, Ho Chi Minh City, Vietnam

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ABSTRACT

A congenital defect of the fetal intestinal rotation, known as malrotation of the gut, is most often identified as an acute intestinal occlusion in early infancy. Adults with this disease tend to be asymptomatic and extremely rare. We present a case of a 47-year-old woman with duodenal obstruction due to Ladd's band admitted with acute abdominal pain and vomiting.

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Introduction

Malrotation of the gut, a congenital disease, typically presents in childhood. Symptomatic presentation of this condition is extremely rare in adults, with an incidence of about 0.2% [1,2], often leading to delayed diagnosis. However, since some rotational abnormalities remain asymptomatic for the entirety

of an individual's life, the actual incidence remains unknown [3]. When symptomatic, adult patients may present with acute midgut volvulus or internal hernias caused by Ladd's band. Computerized tomography (CT) scans have a diagnostic accuracy of 80% [4] and can identify specific abnormalities indicative of malrotation. In this article, we present the case of a 47-year-old woman with duodenal occlusion due to Ladd's band. This case report and literature analysis are intended to

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* Corresponding author.

E-mail address: bsnguyenminhduc@pnt.edu.vn (N.M. Duc).

¹ These authors contributed equally to this article as co-first authors

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improve clinicians' understanding of intestinal malrotation and reduce the likelihood of missed clinical diagnoses.

Case report

An otherwise healthy 47-year-old woman with no relevant family or medical history presented to our hospital complaining of 3 months of abdominal pain and vomiting after eating. The patient's abdominal pain subsided after vomiting. On physical examination, there were no abnormal findings or signs of rebound tenderness. Her clinical symptoms outweighed her physical signs.

Laboratory findings, abdominal ultrasound and plain abdominal radiograph was normal. An upper gastrointestinal endoscopy observed no pyloric stenosis. A magnetic resonance imaging scan of the patient's brain was ordered to rule out neurological explanations; no abnormalities were observed. Despite receiving therapy for gastritis (PPI and sucralfate), the patient's symptoms persisted. We recommend an abdominal CT to rule out intestinal tumors. The CT showed dilation of the D1-2-3 duodenum, which was checked for small intestine obstruction and abnormal duodenum rotation. The D3 segment was anterior to the superior mesenteric vein. The cecal gas shadow was on the patient's right lumbar area rather than the right iliac fossa. Additionally, the superior mesenteric vein was anterior and to the left of the superior mesenteric artery (Fig. 1).

The patient was diagnosed with duodenal obstruction due to Ladd's band and underwent surgery. At laparoscopy, the patient's cecum was in the right lumbar area, and their bowel loops were 270° rotated. The small bowel, ascending colon, and one-quarter of the transverse colon were rotated by a clockwise turn on a stalk at the base of Treitz. The mesentery was not fixed to the posterior abdominal wall but only at the angle of Treitz. D2, D3, and D4 descend to the jejunum from the stomach and are connected to it without a distinct boundary. A ligament ran from the cecum through the right abdominal wall (Ladd's band), pressing on it and causing an obstruction at the D2-D3 duodenal segment (Fig. 2).

The patient underwent laparoscopic Ladd surgery, which included the first untwisting of the volvulus. The Ladd's bands, which ran from the caecum to the right upper quadrant to the duodenum, were thick, divided peritoneal bands. The Treitz ligament was torn due to the duodenum being bent and mobilized to the right. Finally, the whole bowel was returned to unrotated form.

After surgery, the patient completely recovered and did not show recurrent intestinal obstruction.

Discussion

An abrupt intestinal obstruction caused by a congenital gut malrotation abnormality is often detected in young children. It is thought to affect 1 in every 500 live newborns. However, because this condition goes undiagnosed during childhood in many individuals, it is challenging to determine its actual in-

cidence. Adults with symptoms are extremely rare, with an incidence of about 0.2% [1,2].

Mall et al. first outlined the embryology of intestinal rotation in 1898. Dott et al. were the first to associate the embryologist's observations with related clinical issues 25 years later [4,5]. Since 1936, when Ladd initially presented his method for treating malrotation and volvulus in 21 cases, it has remained the only proven method for treating intestinal malrotation [5]. Since the midgut outgrows the abdominal cavity during normal embryonic intestinal rotation, it herniates through the umbilical cord between weeks 4 and 6 of pregnancy before returning by week 10. The superior mesenteric artery supplies blood to the midgut, revolving 270° counterclockwise from herniation to peritoneal return. The cecum descends towards the right lower quadrant after the rotation, where it is attached to the abdominal wall by Ladd's bands, and the duodenal-jejunal flexure is on the left side. The small bowel mesentery attaches to the peritoneum through the Treitz ligament at the duodenal-jejunal flexure when the ascending colon acquires a retroperitoneal position on the right side [6,7]. Gut malrotation due to the complete or partial failure of the midgut's 270° clockwise rotation around the superior mesenteric pedicle causes abnormal positioning of the small bowel loops on the right side and the appendix, caecum, and ascending colon on the left side and the Treitz ligament's absence.

Clinical presentation in adults is more variable and can be asymptomatic. Adult patients rarely present with acute midgut volvulus or internal hernias caused by Ladd's bands [1,8,4]. While children often have an acute presentation within the first month of life [9], adults often have a chronic presentation with symptoms over several months or years, with approximately 50% of adults presenting with chronic features [10,11]. The most common symptoms include recurrent stomach discomfort, distension, nausea, vomiting, anal insufflations, and close feces. A few individuals may also have peritonitis due to bowel strangulation and ischemia, and some patients may also have malnutrition [12]. A peritoneal fibrous band—also known as Ladd's band—can compress the duodenum, causing an obstruction. Our patient presented with duodenal obstruction.

Intestinal malrotation's ambiguous symptoms have led to few instances being recorded, and since its diagnostic guidelines only apply to pediatric populations, diagnosing it in adults remains challenging. Patients may present with intestinal obstruction manifestations such as abdominal pain, nausea, and vomiting, although these symptoms may also present with intestinal obstruction due to other causes. Blood tests, abdominal ultrasounds, and X-rays are of minimal value in diagnosing this condition. Specific findings that are diagnostic of malrotation can be detected through CT, considered the investigation of choice, providing a diagnostic accuracy of 80% [4]. Depending on the degree of malrotation, CT may show absence of a retro-mesenteric (retro-peritoneal) D3 segment of the duodenum; large bowel predominantly on the left and small bowel predominantly on the right. In addition, the superior mesenteric vein was to the left of and anterior to the superior mesenteric artery [13].

Regarding the therapy method, Ladd initially described this method in 1932 to treat malrotation and volvulus. It has

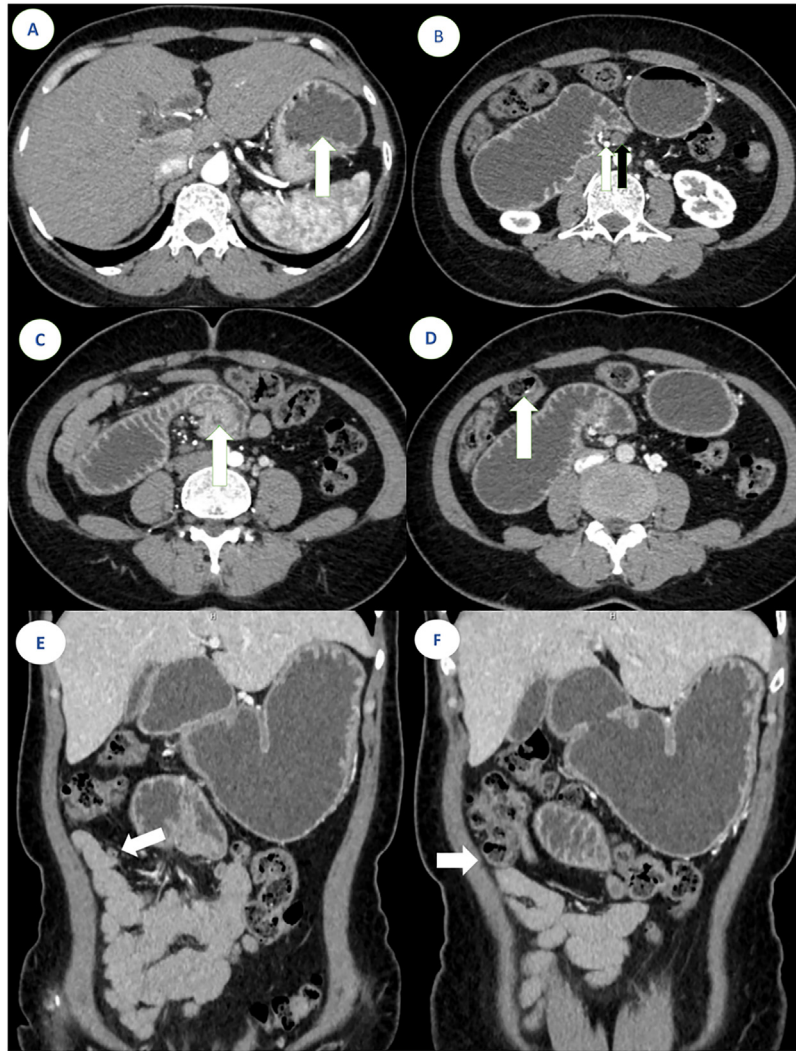


Figure 1 - (A) The CT showed a normal stomach position (white arrow). The dilated D3 segment was anterior to the superior mesenteric artery. **(B)** The superior mesenteric vein (black arrow) was anterior and to the left of the superior mesenteric artery (white arrow). **(C)** The D3 segment showed a sudden narrowing (white arrow). **(D)** The cecal gas shadow (white arrow) was on the patient's right lumbar area rather than the right iliac fossa. The appendix (white arrow in E) and cecum (white arrow in F) were on the right lumbar in coronal images.

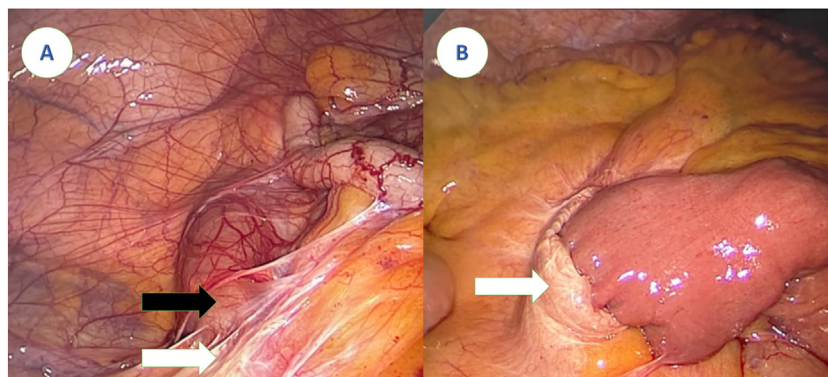


Figure 2 - (A) A peritoneal fibrous band, commonly known as Ladd's band (white arrow), compressed the duodenum (black arrow), causing a blockage. **(B)** The Ladd's band became evident (white arrow).

since been the method used to effectively cure intestinal malrotation. Initial untwisting of the volvulus is part of Ladd's method. Second, there is a division in the thick peritoneal bands, known as Ladd's bands, that extend from the caecum to the right upper quadrant and the duodenum. The duodenum is bent and mobilized to the right, tearing the ligament of Treitz. The whole bowel is then returned to the belly in an unrotated state [14,15]. While we used traditional procedures to address the patient's condition, laparoscopic surgery was used.

Conclusions

The normal fetal rotation of the intestines around the superior mesenteric artery and their fixation in the peritoneal cavity fail in intestinal malrotation, a developmental defect of the midgut. Adults seldom have midgut rotational abnormalities. When they are symptomatic, surgical intervention is typically necessary. With the development of laparoscopic surgery, the patient's procedure and recuperation often proceed well established guidelines for the care of patients with this tumor due to its rarity.

Patient consent

Informed consent for patient information to be published in this article was obtained.

Authors' contributions

Tran ND and Dau QL contributed equally to this article as first authorship. Tran ND and Dau QL: Case file retrieval and case summary preparation. Dau QL and Nguyen MD: preparation of manuscript and editing. All authors read and approved the final manuscript.

Availability of data and materials

Data and materials used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

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