

## Case Report

# Banded For Trouble! A Case Report On Chronic Midgut Volvulus In A 70-Year-Old Due To Ladd's Band With A Review Of Literature

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## Abstract

**Background:** Midgut volvulus is a rare but serious condition caused by the twisting of the intestines around the superior mesenteric artery (SMA), often associated with intestinal malrotation. It can present in both pediatric and adult populations, with adults experiencing a more chronic presentation. The condition may be complicated by the presence of Ladd's bands, fibrous structures that can obstruct the duodenum and lead to bowel ischemia.

**Case Report:** A 70-year-old female presented with a three-month history of solid food intolerance, recurrent bilious vomiting, and generalized limb swelling. Physical examination revealed pallor, abdominal distension, and severe limb oedema, with chest X-ray showing bilateral pleural effusion. Ultrasound indicated collapsed small bowel with mild ascites. Contrast-enhanced CT showed a severely dilated stomach and duodenum, with a characteristic "corkscrew" sign indicating volvulus. Laparotomy revealed clockwise rotation of the small bowel around the SMA and Ladd's bands compressing the duodenum. Adhesiolysis and mesenteric widening were performed, and the bowel was repositioned. The patient was discharged on postoperative day 4, symptom-free, with follow-up at six months showing no recurrence.

**Conclusion:** Midgut volvulus is a rare but critical condition in adults, often presenting with nonspecific symptoms. Timely diagnosis and surgical intervention are crucial to prevent severe complications such as bowel ischemia and gangrene.

**Keywords:** Midgut volvulus; Ladd's bands; Ladd's procedure; obstruction.

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## Introduction

Midgut volvulus is a serious and potentially life-threatening condition resulting from the twisting of the intestine around the superior mesenteric artery, often leading to bowel ischemia. It is frequently associated with intestinal malrotation, a congenital abnormality in the positioning of the intestines during embryonic development. Although midgut volvulus is more commonly seen in infants and children, it can also present in adults, typically in a chronic form, with nonspecific symptoms such as intermittent abdominal pain, vomiting, and signs of partial bowel obstruction. A significant contributing factor to midgut volvulus, especially in cases involving malrotation, is the presence of Ladd's bands. These are abnormal fibrous bands that extend from the cecum to the retroperitoneum, crossing over the duodenum and potentially causing duodenal obstruction, formed due to incomplete rotation of the large bowel during 8-10 weeks of foetal development.

In pediatric populations, this malrotation is usually diagnosed before 1 year of age, but in some cases, Ladd's bands may remain undiagnosed until adulthood, leading to chronic or acute presentations of small bowel obstruction.<sup>1</sup> Ladd's procedure, which involves adhesiolysis, widening of mesentery, and bowel repositioning, was devised by Dr. William Edwards Ladd<sup>2</sup> in 1936 as a procedure to correct intestinal malrotation.

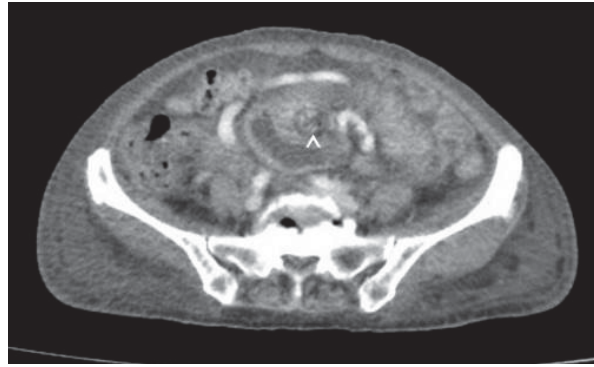
This case report describes the unusual presentation of midgut volvulus in a 70-year-old patient, following SCARE guidelines.<sup>3</sup>

## Case report

A 70-year-old female presented to the emergency room with a history of three months of inability to tolerate solid food, recurrent bilious vomiting, and generalised swelling of



**Figure 1.** Contrast-enhanced CT of the abdomen in coronal section showing a hugely dilated duodenum (X) with sudden cut-off (\*) just beyond DJ flexure and collapsed small bowel loops with maintained vascularity

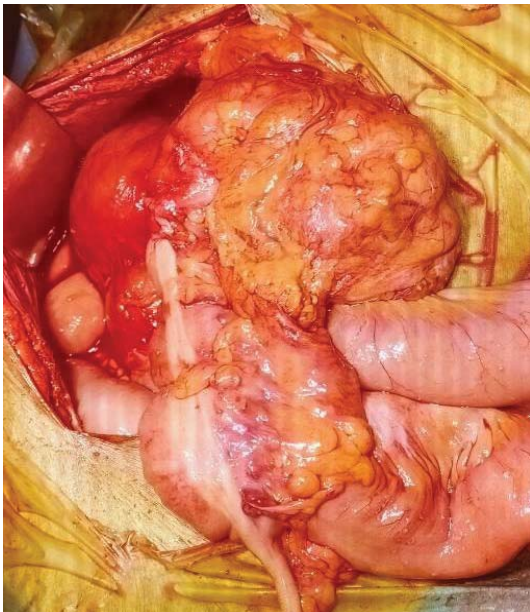


**Figure 2.** Contrast-enhanced CT of the abdomen in transverse section showing the mesentery twisted (^) and the pathognomonic 'corkscrew sign', with twisting of mesenteric vessels without occlusion.

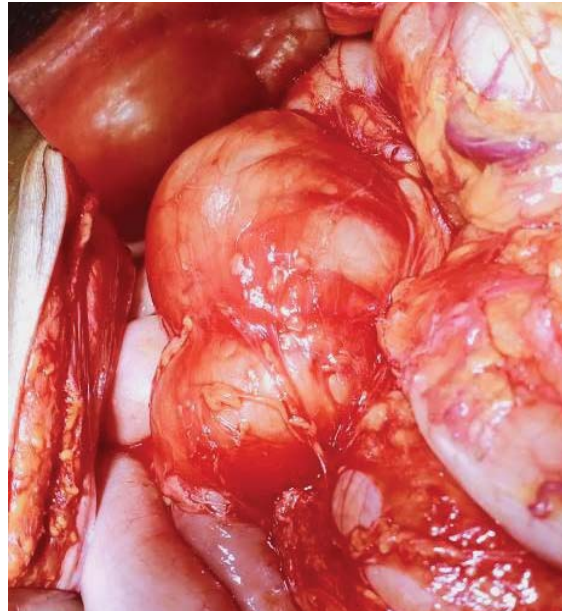
limbs. On examination, the patient was clinically pale; the patient's abdomen was found to be scaphoid in shape, with no signs suggestive of peritonitis. The patient had severe limb oedema with the presence of bilateral pleural effusion on chest X-ray films. Ultrasound examination showed collapsed small bowel with mild ascites. Nasogastric decompression was done, which led to the aspiration of nearly two litres of bile. The patient was optimised haemodynamically, and was gradually allowed semi-solid diet, which the patient was able to tolerate, despite occasional upper abdominal pain. Contrast-enhanced CT abdomen was done, which showed a severely dilated stomach and duodenum - up to its 2<sup>nd</sup> or 3<sup>rd</sup> part - with twisting of the mesentery and the 'corkscrew' sign, which is a tell-tale sign for volvulus, without bowel ischaemia and superior mesenteric artery (SMA) patent in its entire

course. With a diagnosis of midgut volvulus, the patient was taken up for laparotomy.

A midline incision was chosen for exploration. We found the small bowel minimally distended and located in the right side of the abdomen, with it being proximally rotated in clockwise manner around the SMA. The caecum and ascending colon were located in the midline, with dense lateral adhesions to the caecum (Ladd's bands) compressing the 2<sup>nd</sup> and 3<sup>rd</sup> part of the duodenum and causing proximal dilation of 1st part of duodenum and stomach. Duodeno-jejunal (DJ) flexure was found on the right of midline, and the usual C-loop configuration of the duodenum was lost. Adhesiolysis of the Ladd's bands was done, which mobilised the caecum and allowed visualisation



**Figure 3.** Intra-operative photograph taken after division of Ladd's bands, showing the caecum and ascending colon in the midline and the 2nd and 3rd parts of the duodenum showing upstream dilation.



**Figure 4.** Intra-operative photograph showing greatly distended duodenum with adhesions laterally with abdominal wall and medially with head of pancreas – which were lysed and the duodenum mobilised fully; the small bowel is found in the right abdomen and shows distension after division of Ladd's bands and relief of obstruction.

**Table 1. List of cases with salient clinical features and operative findings**

	Case Report	Demographic data		Clinical presentation	Radiological / Intraoperative findings		Other findings/ features
		Age (yrs)	Sex		Bowel vascularity	Signs of obstruction	
1	Dhivakar et al <sup>4</sup>	35	Male	Chronic abdominal pain following food intake	Maintained	Absent	SMA thrombosis with rich collateral circulation
2	Ribiero et al <sup>5</sup>	18	Male	Recurrent abdominal pain, nausea and vomiting	Maintained	Present	Underwent negative laparotomy, and was diagnosed with duodenal obstruction on CT.
3	Dehaini et al <sup>6</sup>	28	Female	Severe pain abdomen with hypotension	Ischaemic	Present	Although de-torsion of the small bowel returned vascularity, a small portion remained dusky in appearance; silo closure of the abdomen was done and the patient was observed until the affected segment returned to normal.
4	Fung et al <sup>7</sup>	53	Male	Severe right upper quadrant pain	Ischaemic	Present	
5	Singh et al <sup>8</sup>	59	Male	Intermittent bilious vomiting, constipation with abdominal distension	Maintained	Present	Concurrent symptomatic right-sided indirect inguinal hernia
6	Mensah et al <sup>9</sup>	35	Female	Acute pain abdomen, vomiting	Ischaemic, with bowel gangrene	Present	Initially diagnosed with placental abruption as the patient was in the 39th week of gestation; she suffered from short bowel syndrome post-operatively but was successfully managed conservatively.
7	McMahon et al <sup>10</sup>	18	Female	Chronic pain abdomen with new-onset vomiting	Maintained	Absent	
8	Galaz et al <sup>11</sup>	25	Female	Failure to thrive, new-onset severe pain abdomen	Ischaemic, with unviable ascending colon	Present	Ladd's procedure was combined with right hemicolectomy and ileocolic anastomosis.
9	Misanik et al <sup>12</sup>	19	Female	Chronic upper abdominal pain with dyspepsia	Maintained	Absent	Concurrent neuroendocrine tumour of the tip of appendix detected on histopathology, no further operative intervention needed
10	Elgeyoushy et al <sup>13</sup>	24	Male	Acute pain abdomen, vomiting	Maintained	Present	Prior history of congenital diaphragmatic hernia, repaired in infancy; the patient's present bowel obstruction was due to jejunoileal band adhesion – which was successfully lysed during Ladd's procedure. At 1 one-month follow-up, the patient presented with generalised pain abdomen and faecal discharge from the abdomen due to bowel gangrene, for which the patient was explored once again.
11	Naddouri et al <sup>14</sup>	18	Female	Acute pain abdomen	Maintained	Absent	
12	Jackson et al <sup>15</sup>	90	Female	Acute recurrent bilious emesis	Maintained	Absent	
13	Saxena et al <sup>16</sup>	55	Male	Abdominal distension with constipation	Maintained	Present	The patient had malrotation without Ladd's bands, with symptomatic obstruction due to compression of terminal ileum by SMA pedicle – a bypass duodenojejunostomy and ileocolic anastomosis was done.

of the duodenum. Adhesiolysis was done between the duodenum and the head of the pancreas - which further relieved obstruction. The superior mesenteric vessels were identified and the small bowel de-rotated. After ensuring vascularity of the small bowel and return of function, mesenteric widening and appendectomy were done. The bowel was repositioned – with the small bowel placed on the right side of the abdomen and the caecum along the midline close to the right parietal wall; caecopexy was not done - and the abdomen was closed with non-absorbable monofilament continuous sutures. Postoperatively, the patient was allowed solid diet on post-operative day (POD) 2 and was discharged uneventfully on POD 4. She was followed up to six months following initial surgery and was symptom-free.

## Discussion

A PubMed search was conducted using a Boolean query including the following keywords- “**adult midgut volvulus**,” “**Ladd’s procedure**,” “**Ladd’s bands**,” and “**malrotation**,” filtered for English-language articles. An initial result of 19 articles was obtained. The lower limit for the age of presentation was taken to be 18 years, which excluded paediatric cases. Analysis of the articles led to the selection of 13 case reports which were deemed relevant after full-text review and included in this literature review.

The mean age of presentation was  $36.7 \pm 16.9$  years, with a range of 18 - 90 years, and no specific gender disposition (Male: Female=1.16:1) was observed. The most common clinical symptom on presentation was abdominal pain (seen in 84.6% of cases) – which ranged from chronic abdominal pain, most commonly after food intake, to severe, acute pain abdomen (six cases). The next most common presentation was vomiting (53.8% of cases; bilious vomiting was seen in two cases), followed by abdominal distention and constipation. The variation in clinical signs and age of presentation is due to variability in the level and completeness of obstruction.

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Most cases were preoperatively diagnosed through contrast-enhanced CT, which effectively diagnosed the level of obstruction and allowed the surgeon to evaluate the viability of the gut through contrast enhancement of the SMA throughout its entire length. Reversible bowel ischaemia was found in two cases, with permanent vascular injury and bowel gangrene being evident intraoperatively in two cases, which necessitated resection of the affected segment. Signs of obstruction were visible on imaging or during laparotomy in ten cases.

The postoperative course was complicated by short bowel syndrome in one case – which resolved spontaneously – while in another case, previous band adhesions and likely recurrent volvulus necessitated exploration one month following initial surgery. As adult midgut volvulus is a rare entity in and of itself, existing data regarding recurrence after Ladd’s procedure is deficient, with few case series reporting rates of recurrent volvulus between 0-18 percent at 10 years post-initial surgery<sup>17</sup>, and so a case can be made for caecopexy during the index operation in some patients<sup>18</sup>, though the decision should be individualised based on the degree of rotation and the anatomy achieved following detorsion. In this case report, however, the advanced age of presentation of this patient will likely obviate the likelihood of recurrence and at present, she is asymptomatic six months following surgery.

## Conclusion

Midgut volvulus remains a rare and often clinically silent cause of obstruction in adults – especially in geriatric populations where malignant bowel obstructions are far more common. Due to the non-specific symptoms at presentation and difficulty to diagnose even on advanced imaging modalities, delays in diagnosis are common and may often lead to catastrophic results including bowel gangrene and short bowel syndrome. It is therefore imperative to keep in mind the possibility of midgut volvulus and adequately evaluate patients for rapid surgical management.

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