

CASE REPORT

Laparoscopic Management of a Volvulus Secondary to Midgut Malrotation in an Adult with an Incidental Meckel's Diverticulum

¹SY Lim, ²Tikfu Gee, ³Zubaidah Hanifah

ABSTRACT

Volvulus is the twisting of the intestine around the axis of its mesentery resulting in ischemia and eventual gangrene. Among the pediatric population, volvulus is common due to midgut malrotation. However, this is a rare etiology of volvulus among adults. Unlike in the pediatric population, midgut malrotation in an adult does not present typically with bilious vomiting. The symptoms are often nonspecific and commonly manifest as chronic abdominal pain which may be mistakenly diagnosed as acute gastritis or cholecystitis. A 25-year-old man presented with a sudden episode of abdominal pain, distension, and vomiting. Abdominal X-ray and computed tomography scan revealed dilated small bowel and a high location of the vermiform appendix. There were ascites but no pneumoperitoneum. A diagnostic laparoscopy was then performed, as the cause of the intestinal obstruction could not be determined. The small intestine was grossly dilated until the distal ileum, where the jejunum was twisted along its mesenteric axis several times. A short segment of the jejunum appeared gangrenous. The terminal ileum was completely collapsed, and a Meckel's diverticulum was incidentally discovered. The twisted jejunum was rotated counterclockwise laparoscopically while freeing the adhesions around it. A limited enterectomy with primary anastomosis was made using staplers. The postoperative period was marked by a brief period of ileus, but the patient was discharged well a week after the surgery. Volvulus and intestinal obstruction in a young adult may occasionally have a congenital etiology. Although intestinal obstruction is a relative contraindication for laparoscopy, it may be feasible in the early presentation of obstruction especially where a preoperative diagnosis is uncertain.

Keywords: Laparoscopy, Meckel's diverticulum, Midgut malrotation, Volvulus.

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¹Trainee Lecturer, ²Head, ³Senior Lecturer and Consultant

¹⁻³Department of Surgery, Universiti Putra Malaysia, Serdang Selangor, Malaysia

Corresponding Author: SY Lim, Trainee Lecturer, Department of Surgery, Universiti Putra Malaysia, Serdang, Selangor Malaysia, Phone: +0123302008, e-mail: surgeryupm@gmail.com

INTRODUCTION

Malrotation of the midgut is a congenital condition due to an embryonic anomaly in the fetal gut rotation occurring in about 1 in 500 live births.¹ The exact incidence is unknown as some cases are asymptomatic. It is usually present in the first month of life and remains an important cause of volvulus and intestinal obstruction in the pediatric age group.² Symptoms include abdominal distension, cramp-like pain, and vomiting.

Some cases rarely remain undetected until adult life, although the majority of them are incidentally diagnosed during imaging or abdominal surgery for other unrelated conditions.^{3,4} A minority of adult malrotation present with either acute or chronic abdominal pain, bloatedness, and distension. Most of the time, surgeons mistakenly diagnose these patients as having acute gastritis or cholecystitis.

Volvulus is the twisting of the intestines around the axis of its mesentery. It may be intermittent and readily untwist on its own, or the condition may persist to the point of strangulation and gangrene. In the adult, volvulus is either primary or secondary to adhesions, bands, or congenital malrotation.

We reported a case of an acute volvulus secondary to a midgut malrotation with an incidental Meckel's diverticulum in an adult with the diagnosis made preoperatively with a computed tomography (CT) scan and managed using the laparoscopic approach.

CASE REPORT

A 25-year-old man presented to the emergency department with an acute episode of abdominal pain, distension, and vomiting. He had similar complaints throughout the year before, and his attending surgeon diagnosed him with repeated episodes of acute cholecystitis. Incidentally, he had gallstones, and he underwent laparoscopic cholecystectomy. During the operation, the surgeon had then found a "congenital anomaly of the intestine" but did not proceed to correct or further diagnose the condition.

Abdominal X-ray revealed dilated small bowel, and although a suspicion of adhesions from the previous surgery was a possibility, a contrasted CT scan of the abdomen was performed given the history of a small intestinal anomaly. The findings confirmed the small intestinal obstruction and a high location of the vermiform appendix and cecum below the right lobe of the liver. Free fluid was present in the abdomen without any signs of perforation or pneumoperitoneum. A diagnosis of a midgut malrotation and small intestinal obstruction was made.

A diagnostic laparoscopy was then performed with the findings of grossly dilated small intestines until the distal ileum. The distal ileum was twisted along its mesenteric axis several times and the bowel appeared dusky and congested. The terminal ileum was collapsed but remained viable. A Meckel's diverticulum was discovered incidentally. The volvulus was untwisted laparoscopically in a counterclockwise direction, and the mesenteric pedicles were widened by releasing adhesions between the cecum and the duodenum around the superior mesentery artery (SMA). Ladd's bands were released. As the bowel appeared ischemic, an enterectomy was performed extracorporeally through a small incision in the right hypochondrium. A stapled side-to-side primary anastomosis was made. Caecopexy was performed using nonabsorbable sutures, and appendicectomy was prophylactically performed. The postoperative period was marked by a brief period of ileus, but the patient was ambulating on the first day following surgery and had experienced tolerable pain. He was discharged a week after the surgery.

DISCUSSION

Midgut malrotation is a congenital anomaly due to a failure in the normal counterclockwise rotation of the embryonic gut. There are varying degrees of this anomaly and may be characterized by the right-sided location of the small intestines, displacement of the cecum toward the right hypochondrium and the ligament of Treitz inferiorly, the presence of Ladd's bands, and a narrow base of the small intestinal mesentery. The latter may result in a volvulus of the small intestines which can manifest acutely or chronically. Internal herniation and duodenal obstruction may also take place due to the presence of the anomalies.^{1,2}

However, most of the complications arising from midgut malrotation manifest in the pediatric age group. Some remained asymptomatic until adult life.

Adult manifestations of midgut malrotation differ from the pediatric group. More often, symptoms tend to be chronic rather than acute, characterized by cramp-like abdominal pain, bloating, and vomiting over a period of months to years.² Frequently, these symptoms are mistaken for another condition. The commonest cause of an acute presentation of midgut malrotation in an adult is a volvulus or an internal herniation due to Ladd's bands.³

Preoperative diagnosis of midgut malrotation is currently possible with the increasing use of preoperative imaging. A plain abdominal X-ray may show a nonspecific bowel dilatation, but it may help lead to subsequent investigations. The upper gastrointestinal contrast study remains to be a gold standard for the diagnosis of midgut malrotation.³ Ultrasound abdomen has also been described with a typical presentation of the "whirlpool sign."^{3,4} However, in the acute or emergency setting, especially with the presence of an intestinal obstruction, ultrasound or contrast studies are rarely being performed. Contrast CT scans, on the contrary, may be the preferred choice of imaging.³ The twisting of the intestines around its axis gives the appearance of the "whirlpool sign."

Elective surgical correction of symptomatic midgut malrotation is recommended to prevent acute presentations and complications like bowel ischemia and gangrene.³⁻⁵ Resolution of symptoms was seen in most patients following elective surgical repair.²⁻⁵ In acute presentations of midgut malrotation or intestinal obstruction, surgical repair is performed by correction of the malrotation by freeing the adhesions around the SMA, a counterclockwise rotation of the small intestines, a release of the Ladd's bands, and fixation of the cecum and right colon to the abdominal wall. The laparoscopic approach has been described to be safe and feasible, and equally as effective as the open procedure in the absence of a midgut volvulus.³

In conclusion, midgut malrotation may be a rare but important cause of volvulus in adults. Its presentation may vary from a chronic to an acute setting. An index of suspicion should be present in the adult patient having nonspecific abdominal symptoms or intermittent intestinal obstruction. Symptomatic midgut malrotation should be electively repaired before potential complications like bowel ischemia and volvulus occur as evident in this patient. Early diagnosis followed by an immediate repair may prevent a fatality. The laparoscopic approach is feasible and safe even in the acute setting and may result in less postoperative pain and early ambulation.

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