

Acute Midgut Volvulus in a Previously Healthy 9-Year-Old Boy

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Abstract

Intestinal malrotation is an uncommon cause of bowel obstruction after the first month of life. Nevertheless, this abnormality can be diagnosed even at older ages. In this case, we present a 9-year-old, healthy, well-nourished boy who came in Emergency Department with intermittent cramping abdominal pain, associated with bilious vomiting. After clinical examination, plain AXR, and ultrasonography with no important findings, we performed doppler ultrasound screening of the abdominal vessels, in which abnormal orientation of superior mesenteric vessels was found. After that, contrast-enhanced CT scan was performed, which confirmed the diagnosis of intestinal malrotation, and revealed the “Whirlpool Sign”, confirming the diagnosis of midgut volvulus. He underwent laparotomy and Ladd’s procedure was done for him. We recommend investigation for the possibility of intestinal malrotation in all patients of non-specific abdominal pain regardless of age, even if there is no intestinal obstruction.

Keywords

- Intestinal malrotation
- Whirlpool sign
- Abdominal pain
- Midgut volvulus
- Superior mesenteric artery
- Ladd’s procedure

Introduction

Intestinal malrotation has been defined in the literature as an uncommon congenital anomaly regarding embryologic bowel rotation and fixation.¹

At the fetal phase we recognize three portions

along the intestine: The foregut, the midgut, and the hindgut. The part of the intestine supplied by the superior mesenteric artery (SMA) is known as the midgut, and this part is normally related to a wide mesenteric root at the posterior abdominal wall.

The patients with malrotation have an unfixed

bowel, so that it is held by a precariously narrow mesenteric root.^{1,2}

Among the multiple theories trying to explain the mechanism of clockwise twisting of the midgut, there are some studies which suggest some genetic basis for these cases.³

The disease is usually diagnosed in a previously healthy infant.

Upon 40% of cases of midgut volvulus are diagnosed during the first week of life, up to 75% during the first month, and about 90% will be diagnosed within the first year of life.⁴ However, volvulus and mortality have been reported at all ages.¹ Malrotation can be asymptomatic and diagnosed during investigations for another complaint and may be manifested in other cases by acidosis and shock resulting from complications of midgut volvulus.¹⁻⁵

We should suspect malrotation with midgut volvulus in each sudden bilious vomiting in a previously healthy infant until proven otherwise. Regarding to clinical findings: Initially, the patient has probably a scaphoid abdomen or only mild upper abdominal distension. Furthermore, if vascular compromise to the obstructed bowel develops, then the abdominal distention will progress followed by peritonitis. Late signs include abdominal wall erythema and shock.

As vascular compromise progresses, intraluminal bleeding could take place leading to a bloody defecation. The history, clinical examination, and metabolic acidosis together increase the suspicion

for intestinal malrotation and midgut volvulus.⁵

On the other hand, the diagnostic value of laboratory investigations are often limited and nonspecific.¹

The major role in the diagnosis of malrotation is through imaging investigations, and standard method for diagnosis is the upper gastrointestinal contrast radiology. CT scan signs of midgut malrotation include reversed orientation of superior mesenteric vessels, the positioning of duodenojejunal junction to the right of the abdominal midline; the jejunum on the right and ileal loops on the left side of the abdomen.⁶⁻⁸

In our case, we found the reversed orientation of SMA and SMV on Doppler ultrasound examination and confirmed it by CT images which showed 'Whirlpool sign'.

Case presentation

A 9-year-old boy presented in our institute with a history of intermittent cramping paraumbilical pain for 5 days, which was associated with bilious emesis, without aggravating or relieving factors. No defecation for the last 72 hours.

Physical examination demonstrated unremarkable hemodynamic status. Abdomen was soft without tenderness or abdominal distention, with temperature of 39.5 °C.

Normal Biochemistry, Hematology, Urinalysis, and serum electrolytes.

Plain Abdominal X-Ray revealed lack of Bowel gases without air-fluid levels. Abdominal Ultrasound was without remarkable findings.

However, doppler ultrasound of superior mesenteric vessels demonstrated abnormal location of SMV left to the SMA.

Contrast-enhanced abdominal CT scan was performed, and demonstrated the position of the

doudenoejejunal junction on the right side of the abdomen.

Whirlpool sign have been clearly seen with abnormal position of small intestinal loops on the right of the abdomen **Figure 1**.



Figure 1: Contrast-enhanced CT scan showing the Whirlpool sign.

The patient underwent laparotomy, Ladd's procedure was carried out, including extraction of the bowel outside the abdominal cavity and examining the mesenteric root, counterclockwise derotation of the midgut volvulus which was 360 grade clockwise twisted, lysis of Ladd peritoneal

bands, removal of the appendix, and placing the cecum in the left lower quadrant. The recovery from complaints was during three days of surgery.

Discussion

Midgut malrotation occurs in about 0.2% of

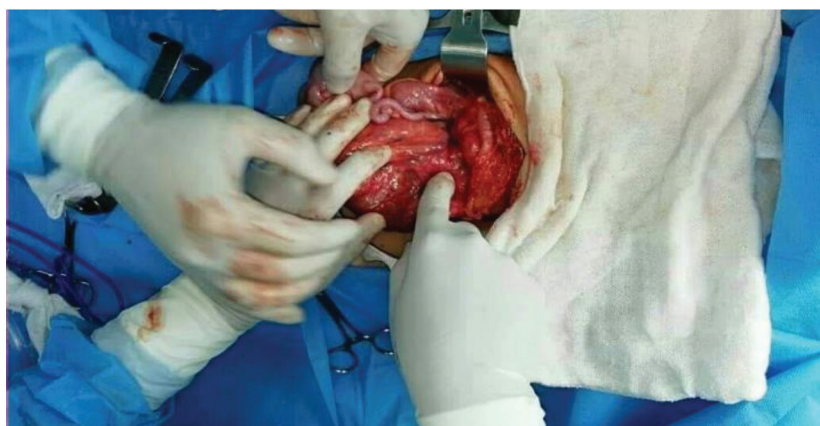


Figure 2: Midgut volvulus on Laparotomy

newborns and the vast majority of cases present during the first month of life.¹ However, there are a few cases who may present even in later ages or may remain asymptomatic.⁶ One can determine the typical signs of intestinal malrotation by ultrasonography, CT scan, or upper GI contrast radiography, which reveals the duodenojejunal junction to the right of the abdominal midline, the jejunum on the right side and cecum on the left side of abdomen.⁷

Diagnostic Gold Standard is the upper gastrointestinal contrast radiography.⁸ An abdominal contrast-enhanced CT scan typically reveals left position of the SMV relative to the SMA, or it even passes behind the SMA, and can reveal the Whirlpool sign in the midgut volvulus. Doppler ultrasound of the upper abdominal vessels can demonstrate similar features.^{6,7} In our case, vertical orientation of SMA and SMV were noted as SMV was in anterior position to the SMA, and Whirlpool sign was clearly seen. Despite these, no complications had occurred. The patient underwent laparotomy and the Ladd's procedure performed, which consists of delivering the bowel loops from the abdominal cavity and inspection

of the mesenteric root, division of abnormal peritoneal bands, prophylactic appendectomy was done for avoiding future mistakes about the pain of appendicitis which is in left Iliac fossa. Complications of the midgut malrotation could be devastating and fatal. Therefore, any patient in any age group experiencing non-specific symptoms of abdominal pain, should be investigated for having potential intestinal malrotation and therefore, should be managed with early operative intervention.^{1,9}

Ethical Consideration

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Conflict of interests

There is no conflict of interest

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