



## Case report

# Ischemic volvulus of the transverse colon caused by intestinal malrotation: A case report

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## ABSTRACT

**Introduction:** Congenital Intestinal malrotation is a complex disorder caused by incomplete or abnormal rotation of the intestine during fetal development. Volvulus of the transverse colon secondary to intestinal malrotation is a rare cause of acute abdomen in adults. It has a high risk of mortality, hence the need for an urgent diagnosis and surgical intervention.

**Case report:** We report an unusual case of volvulus of the transverse colon caused by intestinal malrotation. A 21-year-old woman presented abdominal pain with nausea and vomiting. On clinical examination, the abdomen was tympanic to percussion with peritoneal sensitivity. The abdominal X-ray revealed a massive obstruction of the distended large intestine with a “U-shaped” loop. He underwent an exploratory laparotomy that revealed the diagnosis of transverse colon volvulus with intestinal malrotation. His condition was treated surgically by transverse colectomy with colostomy. The patient died on the second day following a hemodynamic instability.

**Conclusion:** Transverse colonic volvulus is a rare entity with a high mortality, so it requires urgent diagnosis and surgical intervention.

## 1. Introduction

Volvulus of the transverse colon secondary to intestinal malrotation is a rare cause of an acute abdomen in adults. Congenital Intestinal malrotation is a complex disorder caused by incomplete or abnormal rotation of the intestine during fetal development. Some important complications related to this malformation are colon volvulus, intussusception, and megacolon [1].

Volvulus of the transverse colon constitutes a rare surgical emergency and represents approximately 5% of all causes of bowel obstruction. This disease has a high risk of mortality, so it requires urgent diagnosis and surgical intervention [1,2]. We report an unusual case of volvulus of the transverse colon secondary to intestinal malrotation in a 21-year-old woman.

This case report has been reported in line with the SCARE Criteria [3].

## 2. Case report

A 21-year-old woman presented abdominal pain with nausea and vomiting without externalized digestive hemorrhage. Medical history consisted of: cerebral palsy, chronic constipation and the patient was operated 8 years ago for right inguinal. On clinical examination we noted: consciousness disorders, polypnea with a respiratory rate at 24 cycles/min, tachycardia at 120 beats/min, blood pressure at 90/60 mmHg and a temperature at 37.4 °C. The abdomen was tympanic to percussion with peritoneal sensitivity. On rectal examination we noted the presence of traces of stool without rectal intrusive mass.

The abdominal X-ray revealed a massive obstruction of the distended large intestine with a “U-shaped” loop (Fig. 1) and was suggestive of obstruction due to volvulus. The computed tomography demonstrated a dilatation of the right colon and the transverse colon, hemidiaphragms were elevated because of the dilated large bowel, which likely explained the patient's dyspnea (Figs. 2,3).

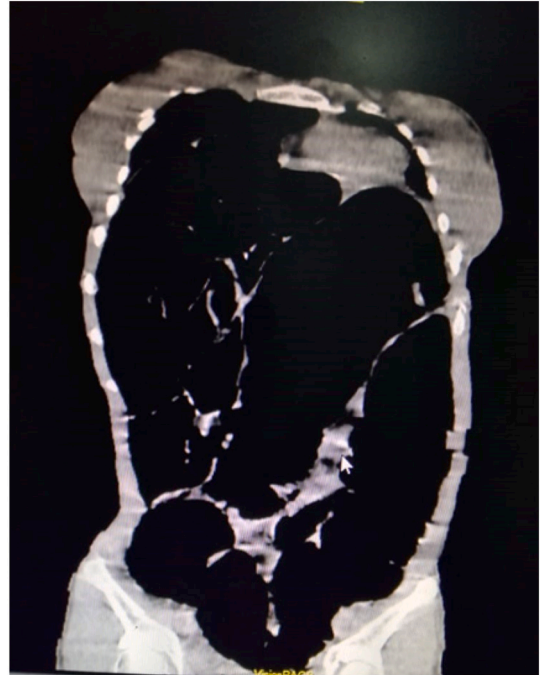
Blood investigations showed hemoglobin at 12.9 g/dL, leukocytosis at 10470/μL, C-reactive protein (CRP) at 87 mg/L, and hyperkalemia at

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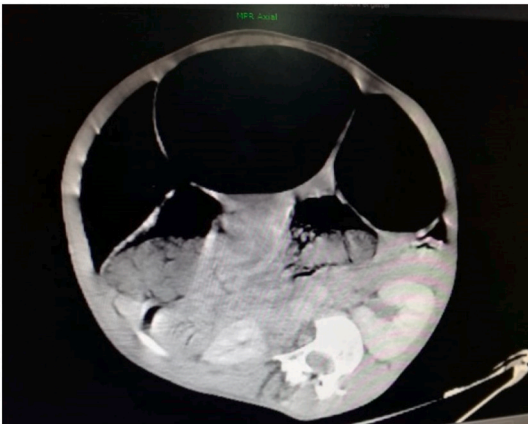
E-mail address: [yaqine.karim@gmail.com](mailto:yaqine.karim@gmail.com) (K. Yaqine).



**Fig. 1.** Abdominal X-ray showing distended colon with elevated hemidiaphragms.



**Fig. 3.** Coronal abdominal CT image demonstrating a significant dilatation of the colon.



**Fig. 2.** Axial CT image demonstrating a massively dilated large bowel, with a "U-shaped" loop.



**Fig. 4.** Intra operative image showing the volvulus of the transverse colon with necrosis and dilated transverse colon. The cecum was in left position.

5,8 mEq/L. Liver and kidney function tests were normal.

An emergency laparotomy was performed after the patient was conditioned. Intraoperative exploration revealed a volvulus of the transverse colon rotated three hundred and sixty degrees clockwise on its mesentery. The point of torsion was found in the left upper quadrant.

The transverse colon was very distended, ischemic and increased in length, with Mesenterium commune and Ladd's bands (Fig. 4).

The volvulus was detoured in a counter-clockwise fashion. We performed a transverse colectomy with a colostomy (Fig. 5), with the cure of the embryological rotation anomaly according to the Ladd procedure (section of the Ladd's band, transformation of the incomplete common mesentery into a complete common mesentery to avoid any recurrence and finally a principled appendectomy) (Fig. 6). The patient died on the second day due to hemodynamic instability secondary to septic shock.

### 3. Discussion

Intestinal malrotation is a rare condition that develops during fetal

growth because of an incomplete intestinal rotation or a lack of intestinal rotation around the superior mesenteric artery [4]. Mesenterium commune, which is a type of intestinal malrotation without fixation to the retroperitoneum, occurs at an estimated incidence of 1 per 10,000 population [1]. Adult presentation is extremely rare with an incidence of 0.2%.

Volvulus of the transverse colon constitutes a rare surgical emergency. It was first described in 1932 by the Finnish surgeon Kallio [1].

Colonic volvulus is a relatively uncommon cause of large bowel obstruction, accounting for 10% of colon obstructions. Only 4–11% of all reported cases of volvulus are due to volvulus of the transverse colon [5].

the physio-pathological mechanism of volvulus formation is based on two properties: redundancy and non-fixation [6,7]. Congenital or acquired anatomical variations may increase the risk of volvulus [8]. Congenital defects such as intestinal malrotation with an imperfect



Fig. 5. Surgical specimen showing transverse colon and appendix.



Fig. 6. Intraoperative image showing the small bowel in the right of the cecum after Ladd's procedure.

fixation to the posterior abdomina. Mechanical causes include previous volvulus of the transverse, distal colonic obstruction, adhesions, malposition of the colon following previous surgery, mobility of the right colon, inflammatory strictures, and carcinoma. Other factors have been reported such as Chilaiditis syndrome, *Clostridium difficile*, pseudomembranous colitis, altered intestinal motricity associated with pregnancy and constipation associated with psychiatric or neurologic diseases such as our case [7].

Malrotation diagnosis is often delayed with a significant increase of

morbidity. Some patients can be asymptomatic throughout life or presenting symptoms in adulthood insidiously in the postprandial period such as: intermittent biliary vomiting (30%), intermittent abdominal pain (20%), oral intolerance, chronic diarrhea, failure to thrive and malabsorption. These symptoms are usually present for a period of about 6 months before the diagnosis is made [9].

The diagnosis of the volvulus of the transverse colon before surgery is rarely observed, it's most often made intraoperatively [6]. This disease was first categorized by Eisenstat et al. as either acute fulminating or subacute progressive. Acute fulminating transverse colonic volvulus is usually described in the setting of marked leukocytosis, acute abdominal pain with rebound tenderness, nausea and vomiting, but limited abdominal distension, bowel sounds on initial presentation are absent or very quickly become so.

Immediate surgical intervention is required in order to resect compromised bowel before gangrene and perforation occurs [5,10]. In its sub-acute form, it manifests with signs and symptoms of large bowel obstruction, but the diagnosis delay can lead to necrosis and peritonitis, the diagnosis is difficult and it is most often done intraoperatively [6].

There are no pathognomonic radiographic signs for Volvulus of the transverse [5]. Some authors have suggested that its appearance can be recognized on radiographs as “loops of dilated large bowel with two air-fluid levels”, the diagnosis can be made on a plain film which reveals the “bird's beak” phenomenon characteristic of any volvulus [1,10]. Even on the abdominal CT scan there are no typical radiographic findings of transverse colon volvulus. The classical ‘bird's beak’ appearance of the transverse colon is seen with contrast enema, but it is not recommended in acute settings because it can delay surgical intervention [6,11].

Transverse colon volvulus is a surgical emergency, the choice of a procedure depends on the general condition of the patient, the presence or not of peritonitis and the local condition of the colon [6,9]. Unlike volvulus of the sigmoid colon and cecum, an endoscopic decompression attempt is not recommended, mainly because of the high probability of necrosis [11].

Actually, detorsion with or without colopexy has a higher rate of recurrence than resection. The incidence of volvulus recurrence following resection and primary anastomosis varies between 22% and 36% [6]. Resection of the involved segment constitutes the treatment of choice followed by primary anastomosis in a one-stage procedure, or a stoma is created; in a two-stage procedure; 2–3 months post-surgery and an end-to-end anastomosis is performed (6). Some authors recommend considering a subtotal colectomy in the presence of a megacolon, instead of partial resection of the involved bowel segment [11].

The Ladd's procedure has been suggested to prevent future complications for Intestinal malrotation and consists of 5 steps; identification and distortion of the volvulus counterclockwise, division of the Ladd bands, division of the fibrous bands between non-cecal intestinal loops and the duodenum for widening of the mesenteric base, and appendectomy, to end the procedure the intestine is placed in its anatomical normal position [12].

The mortality rate of transverse colon volvulus is 33%, which is much higher than the mortality rate of sigmoid colon volvulus or cecum volvulus, which is 21% and 10% respectively [10,11].

#### 4. Conclusion

Transverse colonic volvulus is a rare entity with a high mortality, it can have several etiologies including intestinal malrotation. Early suspicion of the diagnosis is essential to prevent serious consequences and early surgical intervention is essential to obtain better results and avoid complications.

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None.

## Ethical approval

The study is exempt from ethical approval in our institution as it is a “Case report” and not a research study.

## Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

## Author contribution

**Mounir Bouali:** writing the paper. **Karim Yaqine:** Corresponding author writing the paper.

**Abdelilah Elbakouri:** study concept **Fatimazahra Bensardi:** correction of the paper.

**Khalid Elhattabi:** correction of the paper **Abdelaziz Fadil:** correction of the paper.

## Registration of research studies

Not applicable.

## Guarantor

Karim Yaqine.

## Declaration of competing interest

The authors report no declarations of interest.

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