

Cecal Volvulus: A Rare Cause of Acute Intestinal Obstruction - A Case Report and Literature Review

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Abstract

Original Research Article

Cecal volvulus is a rare cause of intestinal obstruction that results from an abnormally mobile cecum twisting around its mesenteric axis. Its non-specific clinical presentation and the relative unfamiliarity of clinicians with the condition frequently delay diagnosis and treatment, exposing the patient to bowel ischaemia, necrosis and perforation. Contrast-enhanced abdominal computed tomography (CT) is currently the most effective imaging modality for confirming the diagnosis and detecting complications. We report the case of a 20-year-old woman admitted for acute intestinal obstruction with abdominal pain, obstipation and bilious vomiting, without fever or haemodynamic instability. Abdominal CT showed marked cecal distension, dilatation of the small bowel and an absence of gas in the distal colon, together with the characteristic whirl sign, indicating an axial cecal volvulus without radiological signs of ischaemia or perforation. An emergency laparotomy confirmed an axial torsion of the cecum involving the terminal ileum, with marked distension and preperforative serosal tears; a right hemicolectomy with primary side-to-side ileo-transverse anastomosis was performed. The postoperative course was uneventful and the patient was discharged on the fifth postoperative day, remaining asymptomatic at one month. This observation is noteworthy because of the young age of the patient, the absence of recognised predisposing factors, and successful management before the development of ischaemia or perforation. It illustrates the value of early CT in young patients presenting with acute intestinal obstruction, since prompt recognition of the whirl sign allows timely surgery. Right hemicolectomy with primary anastomosis remains the treatment of choice, as it definitively eliminates the risk of recurrence while providing excellent long-term outcomes, whereas conservative fixation procedures are now reserved for exceptional circumstances. Early diagnosis and prompt surgical intervention are essential to prevent ischaemic complications and to ensure a favourable outcome.

Keywords: Cecal volvulus; Intestinal obstruction; Whirl sign; Computed tomography; Right hemicolectomy; Mobile cecum; Case report.

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1. INTRODUCTION

Cecal volvulus (CV) is a rare surgical emergency, first described by Rokitsky in 1837 (Rokitsky C, 1837). It occurs when the cecum twists around its mesenteric axis, frequently involving the terminal ileum, and produces a closed-loop intestinal obstruction. Cecal volvulus accounts for approximately 1–2% of all large-bowel obstructions and represents the second most common form of colonic volvulus after sigmoid volvulus (Halabi WJ *et al.*, 2014; Consorti ET & Liu TH, 2005).

This condition may lead to life-threatening complications, including bowel ischaemia, necrosis and

stercoral peritonitis secondary to cecal perforation. Because the clinical manifestations are often non-specific, delays in diagnosis and treatment are common and may contribute to the relatively high mortality associated with the condition (Halabi WJ *et al.*, 2014; Consorti ET & Liu TH, 2005). Surgical intervention is usually required both to confirm the diagnosis and to provide definitive treatment.

The present case is noteworthy because of the young age of the patient, the absence of recognised predisposing factors, and the successful management achieved before the development of bowel ischaemia or perforation.

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2. MATERIALS AND METHODS

2.1. Study design and reporting

This is a retrospective single-patient case report. Clinical, laboratory, radiological, operative and histopathological data were retrieved from the patient's hospital record. The report was prepared in accordance with the CARE (CAse REport) guidelines (Gagnier JJ *et al.*, 2014). Written informed consent for publication was obtained from the patient.

2.2. Literature search

A narrative review of the literature was performed in PubMed/MEDLINE, without date restriction, combining the terms “cecal volvulus”, “colonic volvulus”, “intestinal obstruction”, “whirl sign” and “right hemicolectomy”. Clinical practice guidelines, systematic reviews, imaging series and representative case reports were selected to frame the diagnosis and management of the condition.

2.3. Case presentation

A 20-year-old woman with no significant past medical history presented to the emergency department with acute abdominal pain and obstipation. She also reported nausea and bilious vomiting, and denied any history of gastrointestinal bleeding or weight loss.

On admission she was afebrile and her vital signs were within normal limits. Physical examination revealed abdominal distension with tenderness localised to the right lumbar region. The hernial orifices were intact and digital rectal examination was unremarkable.

An upright abdominal radiograph demonstrated a large air-fluid level in the right abdomen, associated with multiple small-bowel air-fluid levels and without evidence of pneumoperitoneum. Contrast-enhanced abdominal CT demonstrated the characteristic whirl sign, which confirmed the diagnosis of cecal volvulus (Figure 1), together with marked cecal distension, dilatation of the small bowel and an absence of gas in the distal colon, consistent with a closed-loop obstruction (Figure 2). No radiological sign of bowel ischaemia or perforation was identified. Laboratory investigations were within normal limits except for a white-blood-cell count of 12,500/mm³ and a C-reactive protein level of 86 mg/L.

3. RESULTS AND DISCUSSION

3.1. Operative findings and outcome

On the basis of these findings, the diagnosis of cecal volvulus was established and an emergency laparotomy was performed. It revealed an axial torsion of the cecum involving the terminal ileum, with a complete twist around the mesenteric pedicle. This had produced marked cecal distension associated with preperforative serosal tears (Figure 3). A right hemicolectomy with primary side-to-side ileo-transverse anastomosis was carried out. The postoperative course was uneventful and the patient was discharged on the fifth postoperative day. At one-month follow-up she remained asymptomatic, tolerated a normal diet and had resumed her usual daily activities.



Figure 1: Contrast-enhanced abdominal CT, coronal reconstruction: the whirl sign, corresponding to twisting of the mesenteric vessels and bowel loops around the mesenteric axis, confirming the diagnosis of axial cecal volvulus

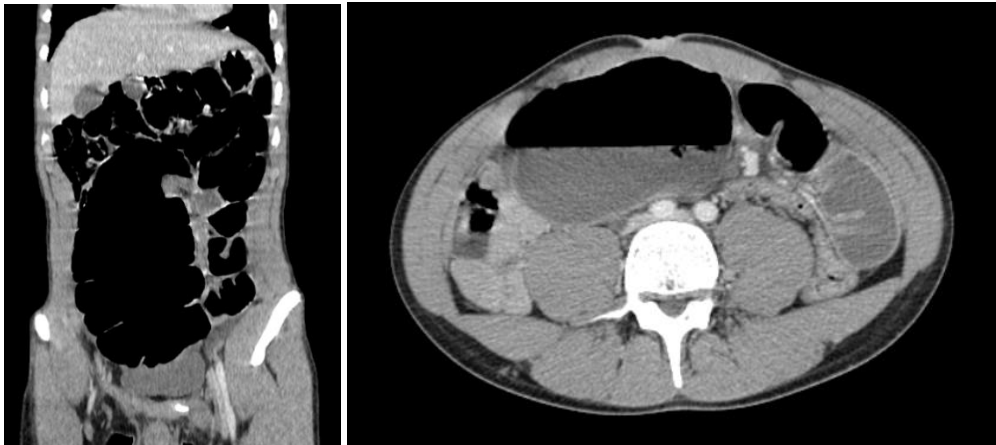


Figure 2: Contrast-enhanced abdominal CT. (A) Coronal reconstruction and (B) axial section showing marked distension of the cecum with dilatation of the small bowel and an absence of gas in the distal colon, consistent with a closed-loop obstruction



Figure 3: Intraoperative view: axial torsion of the cecum involving the terminal ileum, with marked distension and preperforative serosal tears

3.2. Pathophysiology and predisposing factors

Cecal volvulus is the second most common type of colonic volvulus after sigmoid volvulus (Consorti ET & Liu TH, 2005; Hasbahceci M *et al.*, 2012). It is a multifactorial condition that results from a combination of congenital and acquired factors. The principal predisposing factor is an abnormal mobility of the cecum, due to incomplete fixation of the ileocecal region during embryological development (Consorti ET & Liu TH, 2005; Rabinovici R *et al.*, 1990). Additional risk factors include pregnancy, previous abdominal surgery, chronic constipation, a high-fibre diet, and colonic obstruction caused by inflammatory or neoplastic disease (Consorti ET & Liu TH, 2005).

Two distinct anatomical forms have been described. The most common, accounting for approximately 90% of cases, is an axial torsion of the cecum around its mesenteric axis, usually involving the terminal ileum. The second form, known as cecal bascule, represents about 10% of cases and consists of an anterior and superior folding of the cecum without axial rotation (Hasbahceci M *et al.*, 2012; Lung BE *et al.*, 2018). The axial torsion type is more frequently

associated with vascular compromise, bowel necrosis and perforation (Hasbahceci M *et al.*, 2012; Lung BE *et al.*, 2018).

3.3. Clinical presentation

The clinical manifestations are highly variable and non-specific. Up to 50% of patients report symptoms consistent with a mobile-cecum syndrome before the acute event (Consorti ET & Liu TH, 2005); this syndrome is characterised by recurrent episodes of abdominal pain, distension, constipation, nausea and vomiting. In acute presentations, patients typically develop features of bowel obstruction — severe abdominal pain, nausea, vomiting, distension and obstipation — and examination commonly reveals a distended, tympanic abdomen. Delayed diagnosis may lead to bowel ischaemia, necrosis, perforation and stercoral peritonitis, with sepsis and increased mortality (Halabi WJ *et al.*, 2014; Consorti ET & Liu TH, 2005).

3.4. Imaging

Plain abdominal radiography may suggest the diagnosis but has limited sensitivity and specificity (Moore CJ *et al.*, 2001; Rosenblat JM *et al.*, 2010). Typical findings include marked cecal dilatation, multiple small-bowel air-fluid levels, a relative absence of gas in the distal colon and, occasionally, the coffee-bean sign (Moore CJ *et al.*, 2001).

Contrast-enhanced abdominal CT is currently considered the imaging modality of choice, because of its high diagnostic accuracy and its ability to assess bowel viability (Moore CJ *et al.*, 2001; Rosenblat JM *et al.*, 2010; Delabrousse E *et al.*, 2007; Peterson CM *et al.*, 2009). Characteristic findings include marked cecal dilatation, tapering of the afferent and efferent loops at the site of torsion — producing the bird-beak sign — and the whirl sign, which corresponds to twisting of the mesenteric vessels and bowel loops (Moore CJ *et al.*, 2001; Frank AJ *et al.*, 1993). The whirl sign is typically observed in axial torsion but is absent in cecal bascule (Hasbahceci M *et al.*, 2012; Di Dier K *et al.*, 2022). Additional findings include proximal small-bowel dilatation when the ileocecal valve is incompetent, collapse of the distal colon and rectum, and identification of the transition point. CT is also essential for detecting signs of bowel ischaemia, such as bowel-wall thickening, reduced enhancement, pneumatosis intestinalis, mesenteric oedema, ascites, portal venous gas and pneumoperitoneum (Rosenblat JM *et al.*, 2010; Delabrousse E *et al.*, 2007).

3.5. Management

Although colonoscopy has occasionally been used for both diagnosis and decompression in selected patients without signs of ischaemia, its success rate remains low — of the order of 30% — with a significant risk of perforation; endoscopic management is therefore generally not recommended (Consorti ET & Liu TH, 2005; Alavi K *et al.*, 2021).

Cecal volvulus should be regarded as a surgical emergency, even in the absence of bowel ischaemia (Alavi K *et al.*, 2021). Right hemicolectomy with primary anastomosis is the preferred treatment, because it eliminates the risk of recurrence while providing excellent long-term outcomes (Halabi WJ *et al.*, 2014; Alavi K *et al.*, 2021). Among the historical conservative options, cecostomy carried the highest rates of complications, mortality and recurrence and has been abandoned (Rabinovici R *et al.*, 1990). The results of cecopexy were more variable: some series reported no recurrence (O'Mara CS *et al.*, 1979), whereas others found a recurrence rate of about 13% (Rabinovici R *et al.*, 1990), and colopexy combined with resection has also been described (Majeski J, 2005; Anderson JR & Welch GH, 1986). Current guidelines from the American Society of Colon and Rectal Surgeons nevertheless recommend resection, which definitively eliminates the risk of recurrence (Alavi K *et al.*, 2021). Laparoscopic surgery may be feasible in selected patients but is less

commonly performed in the emergency setting because of the marked bowel distension and the associated technical difficulties (Alavi K *et al.*, 2021).

The present case highlights the importance of early CT imaging in young patients presenting with acute intestinal obstruction. Prompt recognition of the whirl sign enabled timely surgical management before the occurrence of ischaemia or perforation, resulting in a favourable outcome.

4. CONCLUSION

Cecal volvulus is a rare cause of intestinal obstruction, resulting from excessive cecal mobility and occurring through either a torsion or a folding mechanism. Its non-specific clinical presentation frequently leads to diagnostic delay. Contrast-enhanced abdominal CT is the cornerstone of diagnosis and allows the early detection of ischaemic complications. Right hemicolectomy with primary anastomosis remains the treatment of choice, as it prevents recurrence and minimises morbidity and mortality. Early diagnosis and prompt surgical intervention are essential to ensure a favourable outcome, a point well illustrated by the present case, in which recognition of the whirl sign in a young patient allowed curative surgery before the onset of ischaemia or perforation.

5. Acknowledgment

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6. Declarations

Reporting guideline. This case is reported in accordance with the CARE (CAse REport) guidelines (Gagnier JJ *et al.*, 2014).

Ethics and consent. Written informed consent for publication of this case report and the accompanying images was obtained from the patient.

Patient perspective. The patient expressed satisfaction with the surgical management and the postoperative recovery, and reported complete resolution of her symptoms with a return to normal daily activities.

Conflicts of interest. The authors declare that they have no competing interests.

Data availability. The data supporting the findings of this case report are available from the corresponding author upon reasonable request.

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