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Epiploic–Mesenteric Knotting as a Rare Cause of Small-Bowel Obstruction

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Case Report

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Abstract

Background

Epiploic–mesenteric knotting is an exceptionally rare cause of acute small-bowel obstruction. The condition results from entanglement between the greater omentum and the small-bowel mesentery, creating a true knot that may rapidly progress to strangulation and bowel necrosis if unrecognized.

Case presentation

A 56-year-old woman with no previous abdominal surgery presented with a 48-hour history of diffuse abdominal pain, distension, bilious vomiting, and cessation of stool and flatus. Examination revealed abdominal distension with diffuse tenderness and hyperactive bowel sounds. Laboratory tests were unremarkable except for a mild elevation of C-reactive protein. Contrast-enhanced computed tomography demonstrated dilated small-bowel loops with a transition point in the mid-jejunum and a whirl sign of the mesenteric vessels, consistent with a closed-loop obstruction but without an identifiable mechanical cause.

Exploratory laparotomy disclosed a tight knot between the greater omentum and the jejunal mesentery, forming an epiploic–mesenteric knot. After gentle detorsion, the bowel regained normal color and peristalsis, and no resection was required. The postoperative course was uneventful, and the patient was discharged on postoperative day 5.

Conclusions

Epiploic–mesenteric knotting should be considered in patients with small-bowel obstruction of unclear origin, particularly when imaging shows a closed-loop pattern or a whirl sign without an obvious cause. Because ischemia develops rapidly, early surgical exploration remains both diagnostic and lifesaving. Prompt recognition and detorsion can prevent bowel resection and ensure an excellent outcome.

Introduction

Acute small-bowel obstruction is a frequent surgical emergency with a well-known hierarchy of causes (adhesions, hernias, neoplasia); by contrast, true intestinal knotting in which bowel or omental/epiploic structures form a constricting knot is exceptional but frequently catastrophic when it occurs. True knots produce a closed-loop obstruction with rapid compromise of mesenteric inflow and venous outflow, which predisposes to strangulation and gangrene unless swiftly relieved [1].

Among intestinal knots, the ileo-sigmoid (double) knot is the most commonly reported subtype, whereas ileo-ileal, appendico-ileal, and omental/epiploic–mesenteric variants are far rarer and documented only as isolated case reports or small series. Reported series and reviews emphasize that predisposing anatomy (long, mobile mesentery or a redundant greater omentum) combined with precipitating factors (vigorous peristalsis, a bulky meal, sudden positional change) likely explain how otherwise normal bowel

may become entrapped and knotted. Because published experience is limited, the true incidence and natural history of these uncommon variants remain poorly characterized. [2,3].

An epiploic–mesenteric (mesentero-omental) knot entanglement between the greater omentum (or an epiploic appendage/epiploic structure) and the small-bowel mesentery is an especially rare mechanism of closed-loop obstruction. Preoperative recognition is difficult: clinical presentation mirrors other causes of small-bowel strangulation, and cross-sectional imaging can be non-specific or fail to demonstrate the knot itself. CT signs that suggest a closed-loop or torsion (clustered dilated loops, whirl sign, radial convergence of mesenteric vessels) may raise suspicion but do not consistently identify the underlying knotting, so timely surgical exploration remains the definitive diagnostic and therapeutic step [4–6].

We report a case of epiploic–mesenteric knotting causing jejunal closed-loop obstruction that was diagnosed only at laparotomy and successfully treated by simple untwisting without bowel resection. The case highlights the anatomical and physiopathological considerations that permit such knot formation, the limitations of imaging in some closed-loop presentations, and the importance of prompt operative management to preserve bowel viability

Case Presentation

A 56-year-old man with no relevant past medical or surgical history presented to the emergency department with a 48-hour history of diffuse abdominal pain, progressive distension, bilious vomiting, and complete cessation of stool and flatus. He denied any prior episodes of similar pain, abdominal trauma, or previous surgery.

On arrival, he appeared mildly distressed but was afebrile and hemodynamically stable. The abdomen was distended, tympanic, and diffusely tender to palpation, without peritoneal signs. No palpable masses or hernias were detected. Bowel sounds were hyperactive and high-pitched. Digital rectal examination revealed an empty rectal ampulla.

Laboratory tests showed a normal leukocyte count (8,900/mm³) and mild elevation of C-reactive protein (18 mg/L). Serum electrolytes, lactate, and renal function were within normal limits.

An abdominopelvic contrast-enhanced computed tomography (CT) scan demonstrated dilated small-bowel loops with multiple air–fluid levels and a clear transition point located in the mid-jejunum. No obstructing lesion, hernia, or mass was identified. The mesenteric vessels appeared twisted, forming a whirl sign—a radiologic feature consistent with a closed-loop obstruction **(Figure 1**). There was no bowel wall thickening, pneumatosis, or free fluid suggestive of ischemia. Based on these findings and the persistence of complete obstruction, an exploratory laparotomy was indicated.

Through a midline incision, exploration of the peritoneal cavity revealed moderate gaseous distension of the proximal jejunum and collapse of distal loops. A tight knot was identified between the greater

omentum and the mesentery of the jejunum, forming an epiploic–mesenteric knot (**Figure 2**). The entrapped segment of small bowel was congested but retained serosal sheen and viable peristalsis.

After careful identification of the involved structures, the knot was gently untwisted. Immediate restoration of mesenteric pulsation and color confirmed viability. No resection was required. The omentum was freed and inspected; no torsion, infarction, or abnormal adhesions were present. The peritoneal cavity was irrigated and closed in standard fashion.

Postoperative recovery was uneventful. The patient resumed oral intake on the second postoperative day, passed stool on day 3, and was discharged home on the fifth postoperative day in good condition. At the two-month follow-up, she remained asymptomatic without recurrence of obstruction.

Discussion

Epiploic–mesenteric knotting sometimes referred to as a mesentero-omental knot is one of the rarest mechanisms of small-bowel obstruction. In this condition, a segment of the greater omentum (or an epiploic appendage) wraps around a loop of small bowel and its mesentery, forming a true constricting knot. The resulting closed-loop obstruction quickly compromises mesenteric blood flow and may lead to infarction if not recognized in time. Because the clinical picture mimics that of any other strangulating obstruction, and imaging findings are often non-specific, the diagnosis is almost always made at surgery [3,4].

The anatomical and functional setting that allows such knotting is still not fully understood. Authors have suggested that a long and mobile small-bowel mesentery, together with a redundant greater omentum, provides the freedom of movement needed for these structures to entangle [3]. Sudden body movements, an abundant meal stimulating vigorous peristalsis, or abrupt changes in intra-abdominal pressure may precipitate the torsion [4]. In patients without previous surgery or adhesions such as ours the mechanism is likely spontaneous, favored by natural anatomic laxity.

Cross-sectional imaging, particularly computed tomography, is invaluable in assessing small-bowel obstruction but remains imperfect for identifying the underlying cause. The whirl sign representing spiraling of mesenteric vessels around a central axis is the most evocative radiologic clue to a closed-loop mechanism [5]. However, it does not differentiate among volvulus, internal hernia, or knotting. The absence of a visible obstructing lesion on CT, coupled with the persistence of complete obstruction, should prompt early surgical exploration rather than prolonged conservative management [7]. In this case, recognizing the whirl sign and acting promptly likely prevented ischemic damage.

At laparotomy, the knot must be handled delicately. Once the omentum and mesentery are identified, careful untwisting is usually sufficient. Bowel viability should then be reassessed after a short period of warm saline compression. If the color and peristalsis fail to return, resection with primary anastomosis becomes necessary [8]. Our patient benefited from early intervention simple detorsion restored perfusion immediately, avoiding resection and its associated morbidity.

Outcomes depend almost entirely on the timing of surgery. Delayed diagnosis often results in necrosis and carries a high mortality rate, historically reaching up to 40% [9]. When treated before irreversible ischemia, prognosis is excellent, and recurrence is exceptional. Awareness of this rare entity is therefore essential, especially when imaging shows a closed-loop obstruction without an obvious cause.

This observation reinforces a lesson that remains valid even in the era of advanced imaging: not all obstructions can be deciphered radiologically. For the emergency surgeon, maintaining a broad differential diagnosis and proceeding to timely exploration can make the difference between bowel preservation and resection and, occasionally, between life and death.

While epiploic–mesenteric knotting itself has only isolated case reports or brief mentions in the literature, true intestinal knotting has been described in other forms. True ileo-ileal knots where two loops of small intestine entwine are exceptionally rare but documented; such cases often present with closed-loop obstruction and may progress to bowel necrosis requiring resection [10]. Intestinal knotting subtypes also include ileosigmoid knots, which are more commonly reported [11], and appendico-ileal knots, in which the appendix encircles the terminal ileum leading to obstruction. Related mechanical causes involving omental bands encircling small bowel have been noted, though these typically reflect simple bands rather than true knots [12]. Collectively, these reports underscore the spectrum of rare peritoneal entanglements that can produce strangulating obstruction and highlight the difficulty of preoperative diagnosis.

Conclusion

Epiploic–mesenteric knotting represents a surgical curiosity that can have devastating consequences if not promptly recognized. Although cross-sectional imaging may suggest a closed-loop obstruction, it seldom identifies the precise mechanism. Awareness of this rare entity, coupled with a low threshold for exploration when the etiology of obstruction remains uncertain, is critical. Early detorsion before irreversible ischemia can result in complete recovery without bowel resection.

Declarations

Ethics approval and consent to participate: Ethical review and approval were not required for the study on human participants in accordance with the local legislation and institutional requirements.

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

Availability of data and materials: Not applicable

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- **Manuscript writing:** Dr Imen Ben Ismail
- **Study concepts:** Dr Imen Ben Ismail, Dr Marwen Sghaier and Dr Ayoub Zoghlami
- **Helped in data interpretation and manuscript evaluation:** Dr Saber Rebii
- **Data acquisition:** Dr Hakim Zenaidi.
- **Critical revision:** Dr Ayoub Zoghlami.

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Figures

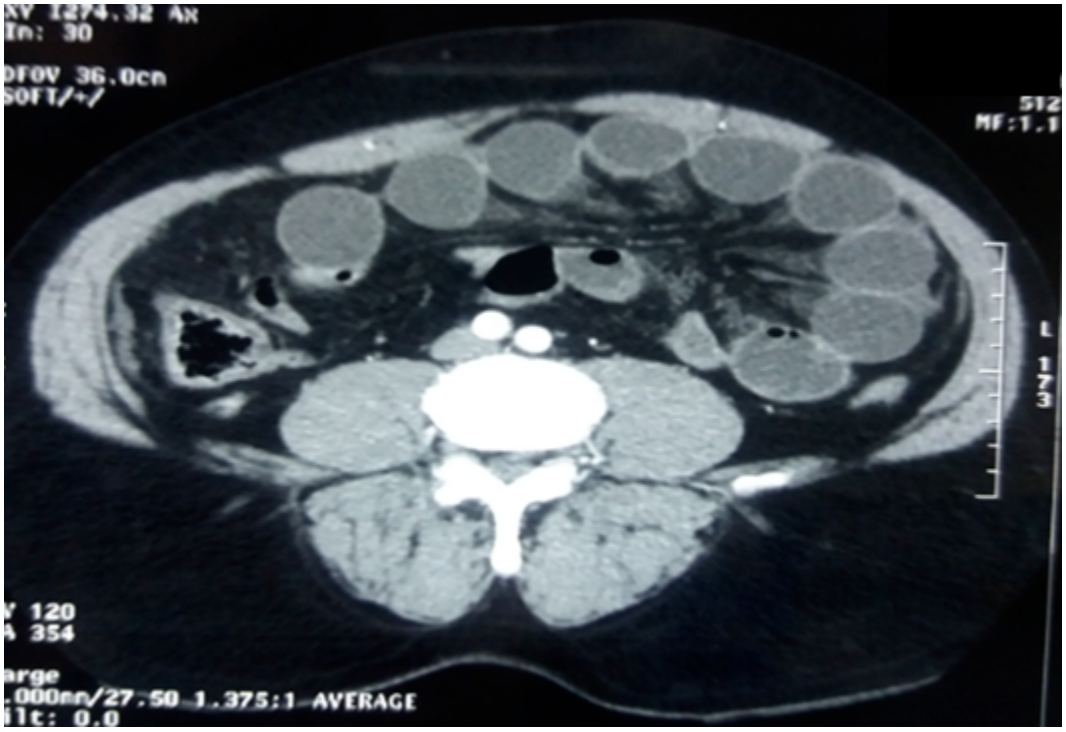


Figure 1

Axial contrast-enhanced CT showing the whirl sign (arrow) of twisted mesenteric vessels, consistent with a closed-loop small-bowel obstruction due to an epiploic–mesenteric knot.

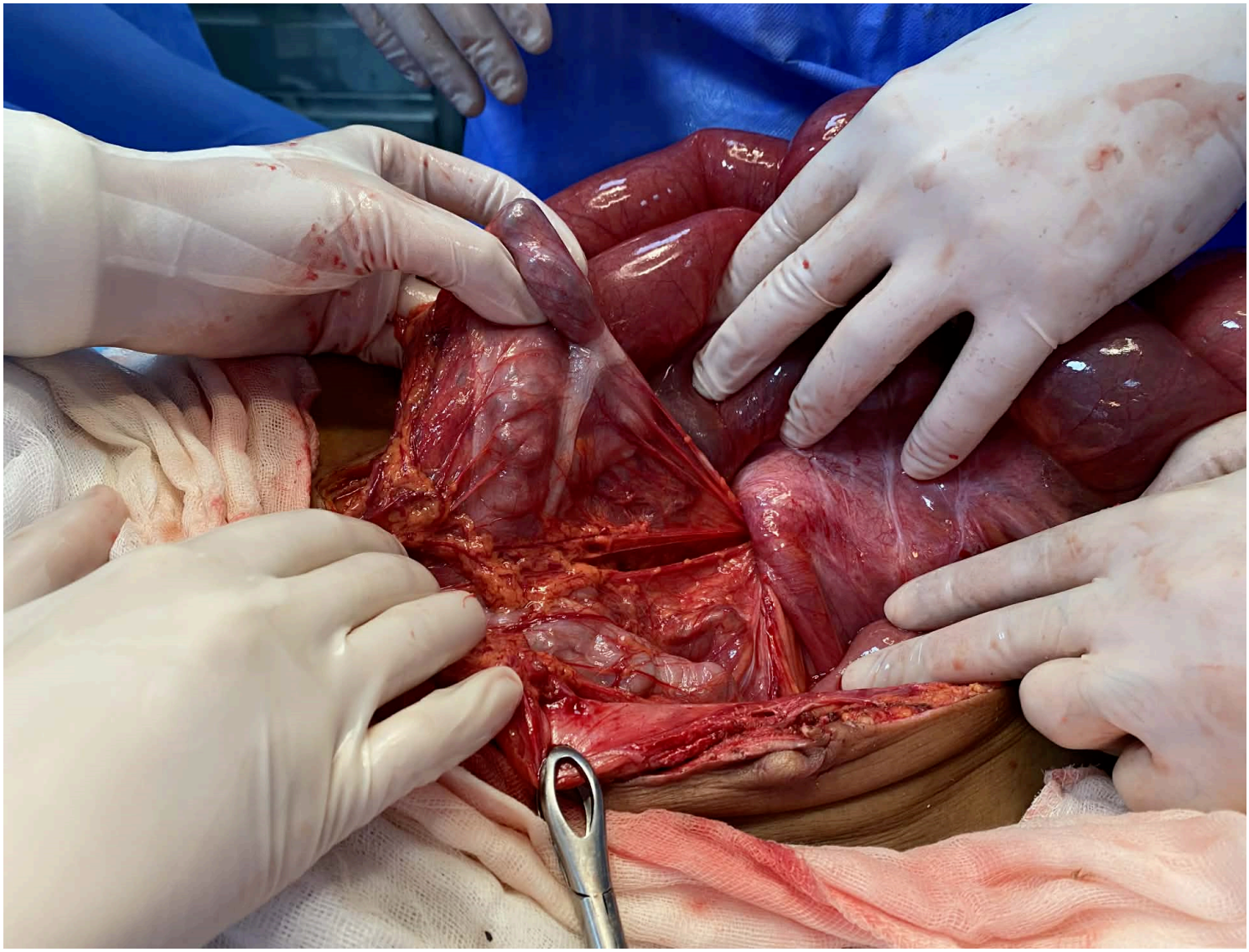


Figure 2

Intraoperative view demonstrating a tight knot formed between the greater omentum and the small bowel mesentery, causing strangulation of a jejunal loop.