

Ileo-Sigmoid Knotting Rare Cause of Acute Intestinal Obstruction

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Abstract: Ileo-sigmoid knotting (ISK) is a rare and potentially life-threatening condition that results in a double-loop intestinal obstruction involving the ileum and sigmoid colon. This case report delineates the clinical presentation of a female patient aged 38 years, who exhibited significant abdominal discomfort and distension, recurrent attacks of vomiting, and absolute constipation. Clinical and radiologic findings suggested bowel obstruction with signs of volvulus. Exploratory laparotomy confirmed type 1A ISK with gangrene of the distal ileum and a redundant sigmoid colon. Surgical intervention included resection terminal ileum with ileocecal anastomosis and sigmoidectomy and colorectal anastomosis. The patient recovered without complications. Timely identification of medical conditions and immediate implementation of surgical interventions are vital to a favorable prognosis.

Keywords: ileo-sigmoid knotting, volvulus, intestinal obstruction, type I knot, emergency laparotomy

Introduction

Ileo-sigmoid knotting (ISK), also known as compound volvulus, is a rare surgical emergency characterized by the twisting of the ileum and sigmoid colon around each other, leading to closed-loop obstruction and rapid progression to ischemia and gangrene. ISK accounts for less than 0.1% of all bowel obstructions.¹ It is more commonly observed in males and in regions such as Africa, Asia, and the Middle East.² Factors such as a long, mobile sigmoid colon and high-fiber diet after fasting may contribute to the risk. Prompt diagnosis is challenging due to nonspecific symptoms, but early surgical intervention is essential to reduce mortality.

The etiology of ISK is controversial, involving certain anatomical aspects of the ileum and sigmoid, including the hypermobile and elongated mesentery with a narrow base. Anatomical factors such as a relaxed anterior abdominal wall, acquired factors such as consumption of high bulky diet and its effects on emptying the small bowel, post-operative adhesion, Meckel diverticula and malrotation must all be considered.

Alver classified ISK according to the active component that wraps around the passive component, whereby:

Type I – the ileum wraps around the sigmoid

Type II – the sigmoid wraps around the ileum

Type III – the ileocecal wraps around the sigmoid

Additional classifications take into account rotation: clockwise add “A”; anticlockwise add “B”.

Anatalamp classified ISK into four types:

Type I – the ileum revolve around the sigmoid

Type II – the sigmoid revolve around the ileum

Type III – the ileocecal segment revolve around sigmoid colon

For undetermined types of ISK, it is impossible to determine how they revolve.

Preoperative diagnosis from clinical findings is possible only in 0–28 of cases.³ All small or large bowel obstructions are either the result of mechanical or paralytic ileus, with or without peritonitis. Preoperative diagnosis is challenging because a high degree of intuition is involved. When a patient presents within 48 hours of experiencing

symptoms and if the obstructions is not reducible with a rectal tube or colonoscopy, if either a small or large bowel obstruction features in the x-ray, ISK is strongly suspected.⁴

Case Presentation

A 38-year-old woman presented at our hospital with a three-day history of severe, intermittent, colicky abdominal pain associated with distension, bilious vomiting and obstipation. She had visited a private clinic and received analgesics and antibiotics but no improvement had occurred.

On examination, she was lethargic, dehydrated, and in visible distress. Her vital signs were as follows: blood pressure 95/60 mmHg, pulse rate 130 bpm, respiratory rate 25, and temperature 37.8 °C. Her abdomen was distended with generalized tenderness and hypogastric fullness. Bowel sounds were sluggish. A rectal examination showed an empty rectum.

Ultrasound revealed a large amount of free fluid resembling massive ascites. A plain abdominal X-ray (erect position) showed multiple air-fluid levels and a coffee bean sign (Figure 1). A CT scan of her abdomen revealed dilated bowel loops, ascites, twisted distal ileum, and sigmoid mesocolon (“whirl sign”) (Figures 2 and 3).

Laboratory values were as follows: Hb 12 g/dL, WBC $8.1 \times 10^9/L$, creatinine 0.8 mg/dL, RBS 255 mg/dL, Na⁺ 135 mmol/L, Cl⁻ 110 mmol/L, and K⁺ 2.5 mmol/L.

The patient was resuscitated with IV crystalloids and broad-spectrum antibiotics until her blood sugar returned to normal. Emergency laparotomy via midline incision revealed alver type 1A or type one Anatalamp ISK, with 100 cm of gangrenous distal ileum and a dusky redundant sigmoid colon. Approximately 2 L of serosanguineous gush fluid was evacuated (Figures 4 and 5).



Figure 1 Plain abdominal X-ray (erect position) showing multiple air-fluid levels and a coffee bean sign.

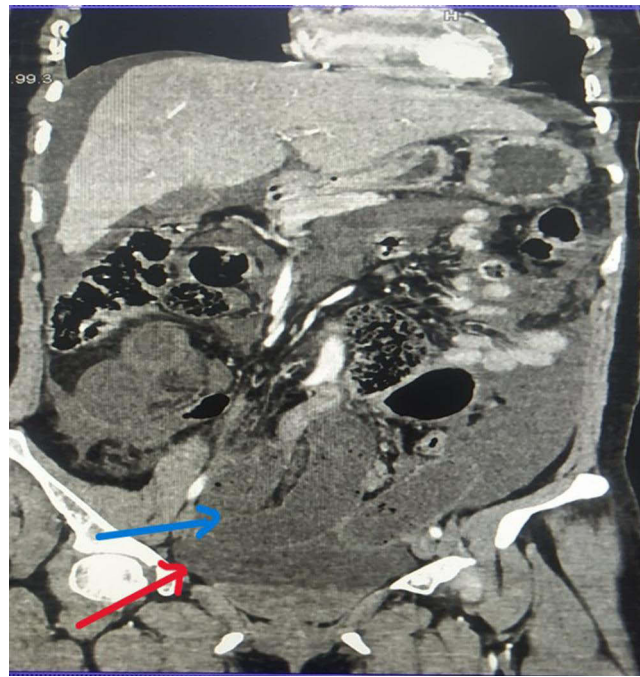


Figure 2 Sagittal CT abdomen demonstrating dilated bowel loops (blue arrow) and ascites (red arrow).



Figure 3 Cross-sectional CT image of the abdomen demonstrating a twisted sigmoid mesocolon ("whirl sign", red arrow), twisted distal ileum, and dilated bowel loops.

Resection of the gangrenous ileum was followed by primary ileocecal anastomosis as the remaining terminal ileum was less than 7 cm from the valve. Sigmoidectomy with primary anastomosis was also performed. Peritoneal lavage was done and a pelvic drain and nasogastric tube were inserted.

The patient was admitted to the ICU for 3 days. She passed a stool on postoperative day 4, tolerated oral fluids by day 5 and a soft diet by day 7, and the abdominal drain was removed on day 8. She was discharged in good condition on postoperative day 10.

Discussion

Ileo-sigmoid knotting (ISK) is a rare but dangerous form of bowel obstruction that combines the risks of both small and large bowel volvulus. It typically occurs in regions with high-fiber diets and where fasting followed by heavy meals is common.^{2,3}

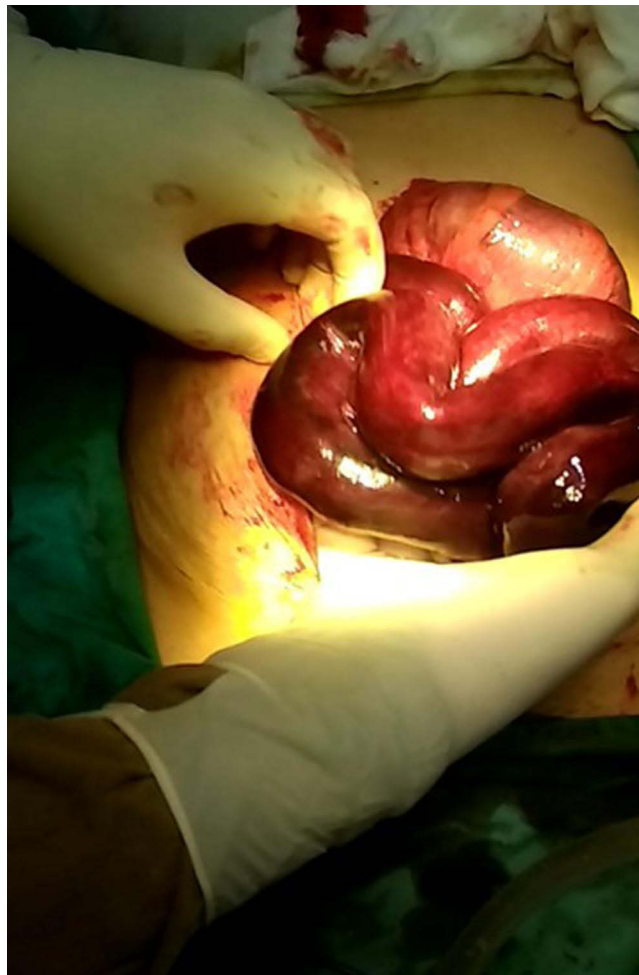


Figure 4 Gangrenous distal ileum and a dusky redundant sigmoid colon.

Alver classified ISK as follows: cation, type I (ileum wraps around sigmoid), type II (sigmoid wraps around ileum), type III (ileocecal segment involved), and type IV (indeterminate).⁵ Rotation is denoted by A (clockwise) or B (anticlockwise). Type IA, as in our case, is the most common.

CT imaging is crucial to reveal the whirl sign, string of pearls, and closed-loop obstruction.⁶ Prompt surgical intervention is necessary, with the procedure based on bowel viability and clinical presentation of patient. However, various surgical interventions can be performed, most commonly ileum resection and primary anastomosis and sigmoidectomy and Hartman procedure; ilial resection and primary anastomosis with sigmoidectomy and colostomy; ilial resection and primary anastomosis; and sigmoidectomy and primary anastomosis.⁴

In this case, ileocecal anastomosis was chosen due to the short distal ileum segment remaining. Sigmoidectomy was also performed because the patient was stable after resuscitation and the bowel was not perforated and there was no fecal peritonitis. The redundant sigmoid was resected to prevent recurrence of sigmoid volvulus.

Mortality rates remain high if gangrene is evident or delayed diagnosis occurs. Early recognition, imaging, and appropriate surgical management are key to improving outcomes.⁷

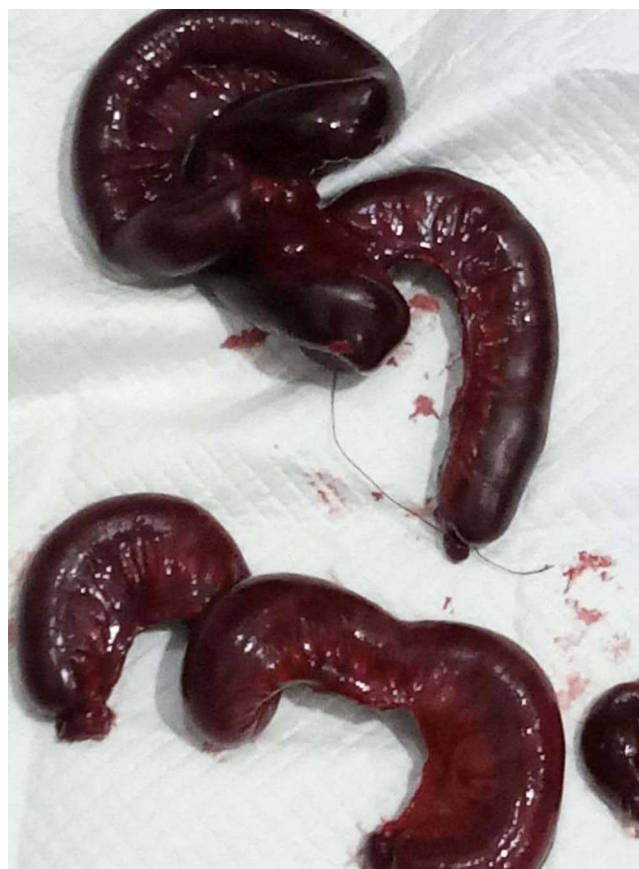


Figure 5 Post-operative finding of gangrenous distal ileum.

Conclusion

Ilio-sigmoid knotting is a surgical emergency that requires a high index of suspicion. Early diagnosis using CT imaging, rapid fluid resuscitation, and definitive surgical intervention can result in favorable outcomes. Awareness of this rare condition is essential, especially in patients presenting with features of both small and large bowel obstruction.

Statement of Ethics and Informed Consent

Written informed consent was obtained from the patient, including for publication of this article and its contents. Approval was granted by the Institutional Tiaba Hospital, Yemen, for publication of this work and any accompanying images.

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Disclosure

The authors declare no conflicts of interest in this work.

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