

Ileosigmoid knot: A case report

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Abstract

The ileosigmoid knot is an uncommon but life-threatening cause of closed loop intestinal obstruction. Its treatment is different from a simple volvulus in that it has to be operated upon immediately. Preoperative CT scan diagnosis and prompt treatment can lead to a good outcome. Findings of simultaneous ileal and sigmoid ischemia with non-ischemic colon interposed in between should, in an appropriate clinical setting, indicate this condition. The presence of the whirl sign, medially deviated distal descending colon and cecum, and mesenteric vascular structures from the superior mesenteric vessels that converge toward the sigmoid colon on CT scan help clinch the diagnosis.

Key words: Compound volvulus; ileosigmoid knot; intestinal obstruction

Introduction

Ileosigmoid knot (also known as compound volvulus) is an unusual and rare cause of intestinal obstruction.^[1,2] In this condition, loops of ileum wrap around the base of a redundant sigmoid colon to form a “knot”. The condition progresses rapidly to gangrene, so early diagnosis and operative treatment are vital. CT scan plays a major role in the evaluation of any acute abdomen.^[3] We describe the CT scan features of this rare condition, the awareness of which can help achieve a preoperative diagnosis.

Case Report

A 22-year-old woman presented with a 3-day history of progressive abdominal pain associated with one episode of vomiting. She had no other concurrent disease and no significant past medical or surgical history. On examination, there was mild tenderness in the periumbilical and right lumbar region. Routine investigations were normal apart from leukocytosis (total count: 20,400/cu mm). The abdominal radiograph revealed a large gas-filled loop of

the bowel in the right mid and lower quadrants [Figure 1]. USG revealed dilated fluid-filled small bowel loops and free fluid in pelvis. A peritoneal tap revealed the fluid to be hemorrhagic.

Contrast-enhanced CT scan of the abdomen revealed a markedly dilated loop of sigmoid colon with loss of haustral pattern, and a thin wall in the right lower abdomen; the “whirl sign” was present, created by the twisted mesentery and bowel, and the afferent and efferent limbs of the sigmoid colon had the appearance of a beak [Figure 2A–C]. Ileal loops were also wrapped around the central whirl, and these too had thin, nonenhancing walls as well as afferent and efferent limbs with the appearance of a beak [Figure 2B–D]. The cecum and the distal descending colon were deviated medially, with their medial borders having a pointed appearance [Figure 2A, B]. Stretched superior mesenteric vessels converged toward the whirl. In view of the history and the CT scan findings, a diagnosis of ileosigmoid knot with gangrene of the involved sigmoid colon and ileal loops was made.

The patient was immediately operated. Laparotomy showed a gangrenous sigmoid volvulus with gangrenous distal ileal loops twisted around it [Figures 3 and 4] and approximately 300 ml of hemorrhagic fluid in the peritoneal cavity. The gangrenous loops were resected and ileo–ascending colon and colo–colic anastomoses were done, along with a proximal defunctioning ileostomy. The postoperative course was uneventful and the patient was discharged a week after the surgery. Subsequent follow-up was uneventful.

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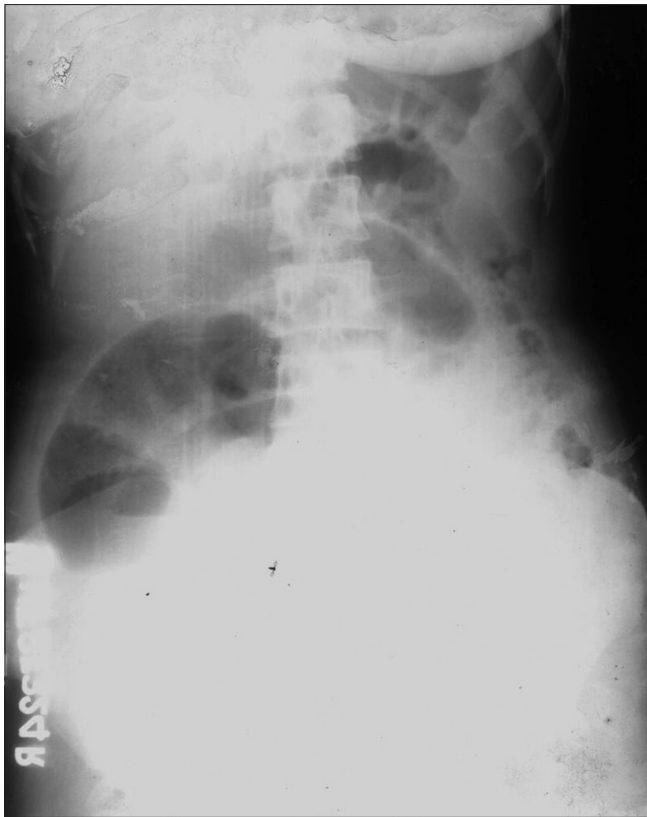


Figure 1: Abdominal radiograph reveals a large gas-filled loop of the bowel in the right mid and lower quadrants



Figure 2 (A–D): Axial CT scan of the abdomen (A) shows a dilated loop of the sigmoid colon with a thinned-out wall (thin arrow). There is medial deviation of the cecum with a pointed medial border (thick arrow). Notice the normal intervening ascending colon (dotted arrow). (B) Caudal CT scan section shows the whirl sign (within the circle) created by the twisted mesentery and bowel (branches arising from the superior mesenteric artery are present in the whirl). There is medial deviation of the distal descending colon with a pointed medial border (thick arrow). Fluid-filled ileal loops with thin non-enhancing walls are seen (dotted arrow). (C) A more caudal CT scan section shows efferent limbs of the sigmoid colon (thick arrow) and the ileal loop (dotted arrow) with appearances of a beak. The whirl sign is present on this section as well (thin arrow). A further caudal CT scan (D) shows fluid-filled ileal loops in the pelvis with thin non-enhancing walls (solid arrow) and free fluid present in the pelvic cavity (dotted arrow)

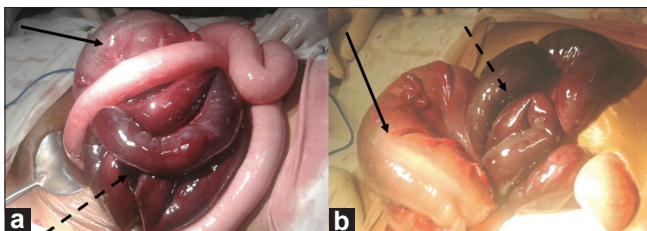


Figure 3 (A, B): Intraoperative photographs show a distended sigmoid colon (solid arrow) and gangrenous ileal loops (dashed arrow) wrapped around each other forming an ileosigmoid knot

Discussion

Overall a rare entity, ileosigmoid knot is more common in Asia, Africa and the Middle East than in the West.^[1,2] It more commonly affects men in the fourth decade.^[4] Alver classified it into four types based on the mechanism of formation of the knot. In type I (the commonest), the ileum is the active component, wrapping itself around the sigmoid colon (passive component) to form the knot, while in type II, it is the other way round. In type III, the ileocecal segment acts as the active component, while in type IV (undetermined type) it is not possible to differentiate the two components from each other. Types I and II can be classified into subtypes A and B depending on whether the torsion is clockwise or counterclockwise, respectively.^[1,5]

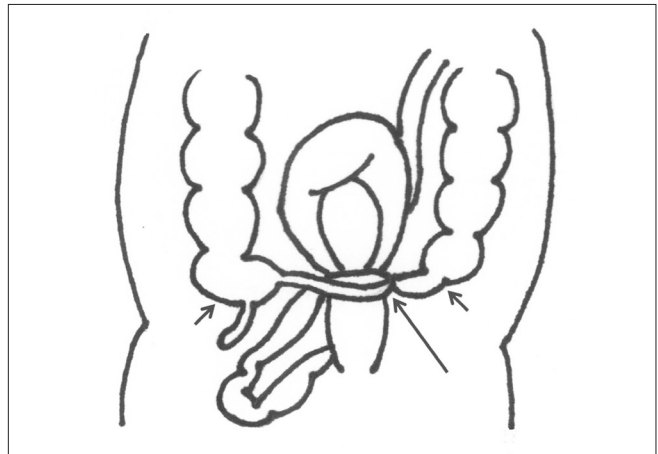


Figure 4: Diagrammatic illustration of the ileosigmoid knot. The long arrow points to the knot while the short arrows point to the medial displacement of the descending colon and cecum

A new classification based on preoperative and operative criteria is also used.^[5]

Although the mechanism by which an ileosigmoid knot develops is still speculative, it is generally accepted that certain anatomical predisposing factors are present, including a hypermobile small intestine with an elongated mesentery and a redundant sigmoid colon with a long mesocolon and a short attachment at the base of the

mesentery. Meckel diverticulum has been reported to be present in 14–53% of cases.^[6] The knotting leads to closed-loop obstruction and causes gangrene of both the ileal loops and the sigmoid colon within a few hours in most patients.

Preoperative diagnosis of ileosigmoid knot is only infrequently made.^[1] Plain abdominal radiographs may show the characteristic double closed-loop obstruction, with the sigmoid colon in the right upper quadrant and the small bowel loops in the left,^[1,7] but this is only an occasional finding. More often, the picture is that of either simple sigmoid volvulus or small bowel obstruction.

CT scan reveals the classic whirl sign of volvulus created by the involved, twisted loops of the intestine and the mesocolon.^[8] The whirl is reported to be visible on a larger number of contiguous slices in an ileosigmoid knot as compared to sigmoid volvulus.^[2] CT scan may also show signs of bowel ischemia. Concurrent ischemic changes in the ileal loops and sigmoid colon should alert the radiologist. CT scan may show medial deviation of the distal descending colon, with a pointed appearance of its medial border, which is a distinct feature of the ileosigmoid knot. This is presumed to be due to the traction effect causing the peritoneum of the left paracolic gutter to move toward the center of the knot and the mass effect of the distended ileal loops interposing between the descending and proximal sigmoid colon and the left body wall.^[2] Similarly, the cecum may show medial deviation due to the tightly stretched terminal ileum between the sigmoid mesocolon and the cecum. Stretched and elongated superior mesenteric (along with inferior mesenteric) vascular structures converging toward the sigmoid colon also indicate the diagnosis.^[9] A radial distribution of the intestine and mesenteric vascular structures on CT scan can also suggest the diagnosis.^[10]

At surgery, a prolonged attempt to untwist the knot is not recommended, especially if the bowel has become gangrenous. Resection with primary anastomosis is advisable. Prompt treatment is mandatory.^[11,12]

In conclusion, the ileosigmoid knot is a rare but life-threatening cause of closed-loop intestinal obstruction.

Findings of simultaneous ileal and sigmoid ischemia with nonischemic colon interposed in between should prompt suspicion of this diagnosis. The presence of the whirl sign on CT scan – medially deviated distal descending colon and cecum, with mesenteric vascular structures from the superior mesenteric vessels converging toward the sigmoid colon – can help clinch the diagnosis.

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