Case Report

A rare cause of acute intestinal obstruction: Ileo-sigmoid knotting type IIA

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ABSTRACT

Ileosigmoid knotting is a rare cause of intestinal obstruction which occurs as a consequence of ileum or sigmoid colon wrapping around the base of each other resulting in double closed-loop bowel obstruction. We report a case of a 52-year-old male who presented in the emergency department with sudden onset of abdominal pain and vomiting. On clinical examination, the abdomen was tender and distended. A chest and abdomen x-ray showed a distended stomach and no sign of bowel obstruction. A computed tomographic scan (CT) revealed a closed-loop intestinal obstruction. We planned urgent Surgery, and the finding was an Ileosigmoid knotting type IIA is rarely encountered in surgical practice.

1. Introduction

Ileosigmoid knotting (ISK), also known as compound volvulus, is a rare entity. Parker first described it in 1845 as a case of intestinal obstruction where a sigmoid fixture strangulated the ileum [1]. Shepherd et al., in 1967 popularized the terminology ISK when they reported ninety-two cases in Uganda [2]. It is common in males, with a peak incidence in the 3rd-5th decade of life, and patients have been reported in the last trimester of pregnancy [3]. The clinical manifestations are nonspecific therefore, ISK is usually diagnosed intraoperatively. Timely diagnosis, appropriate resuscitation, and immediate Surgery are critical prognostic factors for a good outcome. This case is reported in line with scarce criteria [4].

2. Case

Our case is a 52-Year-old male known to have Bronchial asthma with no other chronic comorbidities. He presented to The accident and emergency department complaining of generalized abdominal pain since early morning, colicky in nature, 9 out of 10 in severity. It was associated with nausea and vomiting multiple times with gastric juices. There was no change in bowel habits, no subjective fever, and no urinary symptoms. He had no history of previous surgeries. His vitals were: Blood Pressure 135/80 mmHg, Map 106, Pulse: 61 Beats per minute, respiratory rate 20, Oxygen Saturation 96% on room air. The abdominal exam shows tenderness mainly in the epigastric and umbilical areas, and hernia orifices were intact. Laboratory shows white blood cell count 11.8 X10^9/L, hemoglobin 15 g/dL, Platelets 262 X10^9/L, and Lactic Acid 2.6 mmol/L. Serum Creatinine 0.95 mg/dl. Urea 39.8 mg/dl.

An abdominal x-ray was done and was unremarkable for any obstructive signs (such as air-fluid levels) (Fig. 1-A). A CT abdomen was done and showed: There is a long segment of perpendicularly oriented small bowel dilatation suggestive of closed-loop obstruction mainly involving the ileum segment located within the left lower quadrant measuring around 40 cm long, associated with dilated caliber reaching up to 3.5 mm with diminished wall enhancement and suspicious of pneumatosis intestinalis, findings suggestive of small bowel obstruction with an element of bowel ischemia, considering the study phase limitation no vascular thrombus could be seen. Also noted, the mid-abdominal mesenteric twisting pattern could represent the transitional zone. Presence of inflammatory changes in the form of a large amount of free abdominal fluid and fat stranding. Suspicious few extra-luminal air foci were noted within the central abdomen (Fig. 1-B,C,D).

The diagnosis of closed-loop obstruction was made with questionable bowel viability. The patient was started on IV crystalloid fluid due to dehydration and broad-spectrum antibiotic coverage. Shifted to the operating theatre and an exploratory laparotomy was done, the findings were the Sigmoid was wrapped around the ilium (ileo-sigmoid knot type 2) in a clockwise direction (A) (Fig. 2-A,B), the Sigmoid was very long and redundant, and also has a short mesenteric pedicle (Fig. 2-C). In the beginning, the ileum was questionable regarding its viability; after rewarming and oxygenation, it was viable and preserved successfully.

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Fig. 1. A. Abdominal X-ray, with only distended stomach and no signs of bowel obstruction. B, C, D. CT Abdominal Images Showing the ileo segment closed loop obstruction.

Fig. 2. A. Showing the questionable ileum and ileo-sigmoid knotting. B. A clearer picture of the ileo-sigmoid knotting showing it’s a type II A. C. Showing the redundant sigmoid. D. Showing the resected sigmoid colon.
due to early actions and the decision to operate. Attention was drawn towards the sigmoid as it was long and very redundant, and his condition was stable, so a sigmoidectomy was performed with end-to-side anastomosis (Fig. 2-D). A pelvis drain was inserted, and the abdomen was closed.

The patient was followed up post-operatively and kept on intravenous fluids and antibiotic coverage. Postoperative recovery was uneventful, and discharged on day six for further follow-up in outpatient manifestations.

3. Discussion

ISK is a rare, life-threatening cause of intestinal obstruction. This incidence is unknown, but it is encountered in the areas with a high risk of sigmoid volvulus, Africa, India, South America, Eastern Europe, the Middle East, and Turkey [5,6]. The exact etiology of this disease is unknown. There is a hypothesis that the key etiological factors are long small bowel mesentery, freely mobile small bowel, and redundant sigmoid colon on a narrow mesenteric base. Another theory is that a relaxed anterior abdominal wall allows the torsion of the small bowel, and consumption of a high bulk diet in an empty small intestine as the Muslims practice in Ramadan can lead to ISK [7,8]. Other predisposing conditions, postoperative adhesions, Meckel’s diverticulum with a band, ileocecal intussusception transmesentric intestinal herniation, floating cecum, and malrotation have been reported [9].

ISK causes mechanical double loop obstruction and distention of loops of the sigmoid colon and ileum. There are reports that the incidence of strangulation of both loops of bowel is (73.5–93.9%) [10–12]. Translating bacteria into the peritoneal cavity and releasing endotoxins from the ischemic bowel leads to hypovolemic and septic shock reported in 36.4%–78.1% of patients [13,14]. The reported clinical manifestation of ISK are abdominal pain and vomitting (87–100%) and rebound tenderness (69%) [15]. ISK is classified into three types. In Type I, the ileum is an active component wraps around the passive component sigmoid colon. Type II Sigmoid colon revolves around the ileum (18.9–20.6%). In Type III ileocecal segment wraps around the sigmoid colon (1.5%) [16]. There is new classification ISK is categorized into six types [17].

- Class 1. Patients with no risk factor (advanced age, associated disease).
- Class 2. Those with no shock or bowel gangrene but above risk factors present.
- Class 3. Those with shock.
- Class 4. Those with ileum or sigmoid colon and gangrene.
- Class 5. Those with both shock and ileum or sigmoid colon gangrene.
- Class 6. Those with both ileum and sigmoid colon gangrene.

Preoperative diagnosis of this life-threatening condition is difficult partly due to unawareness of this rare disease and its confusing clinical manifestations.

The imaging modalities, Plain x-ray of the abdomen, and CT scan are useful diagnostic tools. The plain x-ray may show multiple small intestinal fluid levels on the left side and dilated sigmoid colon on the right side. CT scan of the abdomen has a diagnostic accuracy of more than 92%. It will show a twisted intestine and sigmoid mesocolon (whirl sign). If there is radiographic evidence of multiple fluid levels and dilated large bowel, and inability to pass endoscope, these are almost diagnostic features of ISK [18–20]. The initial management of the patients with ISK requires early resuscitation with intravenous fluids, correction of electrolytes and acid base disturbance, nasogastric decompression systemic antibiotics, followed by emergency laparotomy. There is no definite consensus regarding the preferred surgical procedure; various surgical options have been reported in the literature [21–23].

The operative procedure should be decided based on the patient’s condition, intraoperative findings, and status of knotted bowel loops. If both loops are viable, the knot may be untwisted by sigmoid enterotomy and traction. This is also applicable when the sigmoid colon is viable [24]. When both bowel loops are gangrenous, then untwisting the knot is formidable. There is a risk of perforation; therefore, sigmoid colon deflation by a needle is recommended before untwisting or resection is done enblock after clamping the bowel loops.

Sigmoid colectomy is performed irrespective of viability because there is always a risk of recurrent Knotting or volvulus [25,26]. The primary anastomosis can be performed if the terminal ileum gangrenous part is more than 10cm from ileocecal valve. If the gangrenous ileum is within 10 cm of the ileocecal valve then end to end anastomosis is not advisable; the distal stump should be closed and end to side ileoeccectomy should be performed. Hartmann’s procedure is advocated if the viability is doubtful and there is risk of fecal leak [27]. The prognosis of ISK depends upon the duration of symptoms, the patient’s general condition, bowel viability, and sepsis presence. Wound infection and anastomotic leak are common postoperative complications. Ooko et al., after a review of 61 cases of ISK, reported a complication rate was (24.6%) another study from Ethiopia reported complication rate of (60%) [28–30]. Prognosis is good if ISK is diagnosed early and if Surgery is performed within 24 hours. The mean mortality rate in non-gangrenous and gangrenous bowel loops is (6–8%) and (20–100%) respectively [31,32].

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IRB approval.

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Author contributions

Mohammed A Alsuhaimi, Operating surgeon wrote discussion (corresponding author).
Mohammed Abdulah A Aljaysh, wrote introduction.
Halla S Alghamdi, searched references.
Majed S Alotaibi, Assistant surgeon, images.
Abdullah A Alghamdi Wrote Abstract.

Registration of research studies

Name of the registry: Research registry.
Unique Identifying number or registration. Hyperlink to your specific registration (must be publicly accessible and will be checked): http://www.researchregistry.com/browse-the-registry#home/

Guarantor

Mohammed Alsuhaimi.

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.

Provenance and peer review

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Declaration of competing interest

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