

CASE REPORT

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Ileo-ileal knotting causing gangrenous small bowel obstruction; a rare case report

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Abstract

Background Ileo-ileal knotting was first described by Riverius in the 16th century and by Rokitansky in 1836. It is one of the rare causes of acute abdominal pain which mandates urgent surgical treatment. Preoperative investigations are usually nonspecific and high index of suspicion.

Case presentation A 27-year-old male was admitted to Gondar University hospital with a preliminary diagnosis of intussusception and underwent emergency open laparotomy. Intraoperatively a small intestine gangrene caused by an ileo-ileal knot was found. Resection of the gangrenous segment followed by ileo-transverse colon anastomosis was done. Post-operative course was smooth and he was discharged improved.

Conclusion Ileo-ileal knot should be highlighted as a rare cause of acute small bowel obstruction, that necessitates immediate surgical intervention, particularly in resource limited setups, and complications should be considered in the perioperative period.

Keywords Ileo-ileal knot, Case report, Small intestine, Gangrenous bowel

Introduction

Ileo ileal knotting is one of the rare cause of acute abdomen that needs urgent evaluation and timely surgical treatment [1, 2]. Intestinal knot formation occurs when two intestinal segments intertwine together to form a knot resulting in intestinal obstruction and impaired blood flow [3]. It was first described by Riverius in the 16th century and by Rokitansky in 1836 [4]. Most intestinal knots form between sigmoid colon and ileum; But,

knots between two segments of ileum is rare and only handful of cases are reported globally. The etiologies are unknown; But, mobile small bowel with long mesentery, sudden vigorous bowel movement, single bulky meal and pregnancy are incriminated risk factors for knot formation [2, 5]. Ileo ileal knotting often presents with clinical features of small bowel obstruction with rapid deterioration to bowel necrosis and the management involves prompts surgical intervention [2]. Specifically in our case we face a diagnostic challenge and the diagnosis was made intraoperatively.

Case presentation

A 22-year-old male patient who was perfectly healthy 2 h before presenting with frequent bilious, non-bloody, non-projectile vomiting and was admitted to the medical side with the impression of peptic ulcer disease and to rule out acute abdomen. In spite of the treatment for peptic ulcer disease for 8 h, he continued to have severe

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crampy persistent central abdominal pain. Abdominal ultrasound was done while on medical treatment and showed to have ileo-ileal intussusception. Surgical team was consulted after 8 h of patient admission to the emergency department. During surgical evaluation, he looks acutely sick and, have dry lip and buccal mucosa. His vital signs trends (pulse rate increased from 60 to 90 beat per minute, respiratory rate from 18 to 22 breath per minute, temperature was 37.4) from medical side follow up sheet and it shows clinical deterioration. But the numbers were in the normal range for the general population. His abdomen was distended and tender all over. Lab tests showed: WBC 13,900/ul (elevated), neutrophils 86.7% (normal, 37–80). Erythrocyte sedimentation rate (ESR) was 94. The diagnosis of generalized peritonitis secondary to gangrenous ileo ileal intussusception was considered by surgical team and immediate surgical plan was decided based on clinical grounds and lab data. Open laparotomy technique through full midline incision was done as shown below (Fig. 1) during laparotomy, the proximal loop of ileum was knotted onto the distal ileum. The gangrenous segment was 120 cm ileum, leaving only 2 cm ileum near the ileocecal valve. Enbloc resection or untying was impossible and enterotomy with purse string control was done to decompress the content and knot was untied. Due to intraoperative hemodynamic stability and long gangrene bowel resected with high output concern for stoma, resection and ileo-transverse colon anastomosis was done. Post operatively, he was managed in the ward and discharged on his 8th post-operative day with smooth course of post-operative hospital stay (Table 1).

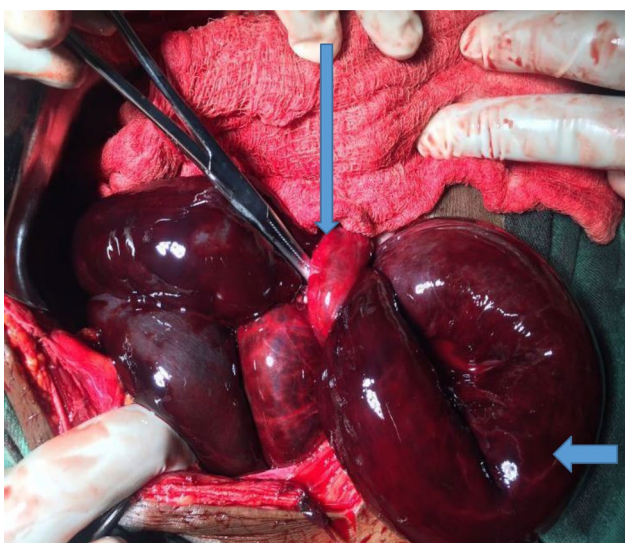


Fig. 1 Intraoperative images of different views that show the small bowel constituted a knot on the distal ileum, resulting in a gangrenous segment. Long arrow shows active component and short arrow shows passive component of small bowel

Discussion

Small intestinal obstruction is a common surgical emergency in both developing and developed countries [10]. The commonest causes in developed countries are post-operative adhesions, hernias and neoplasms but in developing countries volvulus and hernia are common [11, 12]. There are many other causes; like, intussusception, foreign bodies, worm balls and tuberculosis [13, 14]. Ileo-ileal knotting is a special and rare clinical scenario in which a loop of proximal ileum wraps around the distal part of ileum. Preoperative investigations are usually nonspecific and high index of suspicion is needed for early diagnosis and emergent surgical intervention [1, 4, 13–17]. But, literature in both developed and developing countries that showed ileo-ileal knotting as a cause of small bowel obstruction are trace [6, 14]. According to our understanding to date, six cases of ileo ileal knotting were reported from Ethiopia. Gangrene rate were 78–80% and high chances of morbidity and mortality were reported on the literature. It is unknown what causes ileo ileal knotting but the disease is prevalent in sigmoid and small intestine volvulus prevalent areas. This might be because of regions dens high fiber diet access. Increased motility of ileum may also contribute to the cause [13, 14]. There is an assumption also, that this might be associated with loaded bowel with longer mesentery, vigorous peristalsis, single bulky meal, pregnancy and intussusception [18]. The reported mortality rate was nearly 50% [14].

Ileo ileal knotting differs from other causes of small bowel obstruction as it doesn't have specific or classic signs and symptoms for early detection except rapid worsening of patient's condition. Like ileo sigmoid knotting Sever acute pain is the main complain and occur most commonly in the early hours of the morning, awakening the patient from sleep. Vomiting usually occurs at the onset of pain and strikingly abdominal distention is uncommon in ileo ileal knotting while gross distention is the salient feature for other causes of obstruction [6]. In addition to the rarity of the case; shortage of diagnostic imaging materials; like CT scan and qualified human resources makes the diagnosis difficult, especially in resource limited countries like ours, and it increases morbidity and mortality [6, 19, 20]. The patient commonly arrives in the hospital in shock, with pale cold clammy skin. Majority of cases presented with generalized peritonitis due to rapid disease progression to gangrene. There is no gold standard diagnostic modality for ileo-ileal knotting. Diagnosis of ileo-ileal knotting is nearly always done intraoperatively. So, high index of suspicion is mandatory to decrease morbidity and mortality of patients [16].

Patient management should be started early with aggressive fluid resuscitation and Intravenous antibiotics,

Table 1 Ileo-ileal knotting of case reports in Ethiopia

Authors and years	Age (years)	sex	Chief complaint	Location of knot	Bowl viability	Type of surgery	Outcome	Length of hospital stay
Kibret et al(2025) [4]	23	m	severe, progressive abdominal pain, vomiting, distension, and obstipation	120 cm	Gangrenous	right hemicolectomy with an ileo-transverse anastomosis	self-limited diarrhea, Discharged	-
Abebe eat a l(215) [6]	55	F	Abdominal pain, vomiting, abdominal distention	8 cm from the ICV	Gangrenous	Resection of the gangrenous segment and end-to-end jejunoleal anastomosis	Short bowel syndrome, discharged	14
Mohammed et al. (2021) [1]	18	F	Abdominal pain, vomiting, diarrhea	3 cm from the ICV	Gangrenous	Resection of the gangrenous segment, right hemicolectomy, and ileotransverse anastomosis	Discharged	6
Knfe et al. 2023 [7]	13	M	Abdominal pain, abdominal distension, nausea, vomiting	30 cm from the ICV	Gangrenous	Resection of the gangrenous segment and end-to-end ileoileal anastomosis	Discharged	6
Knfe et al. 2023 [7]	12	F	Abdominal pain, fever, vomiting		Gangrenous	Resection of the gangrenous segment and end-to-end ileo-ascending anastomosis	Discharged	7
Mohammed et al. (2023) [8]	35	F	Abdominal pain, vomiting, abdominal distension	10 cm from the ICV	Viable	Untying	Discharged	5
Shale et al. (2023) [9]	35	M	Abdominal pain, vomiting, failure to pass feces	7 cm from the ICV	Gangrenous	Resection of the gangrenous segment and end-to-end ileoileal anastomosis	Moderate anemia, hypoalbuminemia, paralytic ileus, improved and discharged	12
Shimelis, Haddis et al. (2025) (this newcase report)	27	M	Abdominal pain with frequent vomiting	120 cm	Gangrenous	Resection and ileo- transvers colon anastomosis	Discharged	8

nasogastric decompression and catheterization [18]. After stabilization, the abdomen should be explored through open long midline technique and intraoperative management depends on the findings and length of small bowel involved. Some of the options are en bloc resection or controlled untying and Ileo-ileal or ileo-transverse colon anastomosis like in our cases if distal ileum is near to ileocecal valve (< 10 cm) [21, 22]. Decompression or untying of the gangrenous segment is not recommended. But sometimes it is really difficult to untie or do Enbloc resection like in our case scenario. There is high probability of peritoneal contamination following rupture of gangrenous segment during manipulation. The Patients should be followed strictly for possible postoperative complications; among few are, hydration status and anastomotic leak.

Conclusion

Despite the fact that ileo ileal knotting is uncommon, it should always be taken into consideration when making a diagnosis for patients who have signs and symptoms of small bowel obstruction. So, knowledge of high index of suspicion is the most helpful tool as the disease

is associated with high incidence of morbidity and mortality. Because surgery is the main stay of therapy, early detection and treatment are crucial to the best outcome as mortality and morbidity are very high due to rapid progression to ischemia and then gangrene.

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Author contributions

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent for publication

This case report was conducted in accordance with the Declaration of Helsinki. Ethical clearance was obtained from University of Gondar comprehensive and specialized hospital ethical review committee. Written

informed consent was obtained from the patient for publication of this case report and is available to the editor-in-chief upon request.

Competing interests

The authors declare no competing interests.

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