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Strangulated Internal Hernia through Appendicular Tourniquet/Ring: Unusual Cause of Intestinal Obstruction

Authors' Contribution:

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
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Patient: Male, 24-year-old
Final Diagnosis: Internal hernia
Symptoms: Abdominal distension • abdominal pain • dizziness • peritonitis
Medication: —
Clinical Procedure: Laparotomy
Specialty: Surgery

Objective: Rare disease**Background:** Intestinal obstruction secondary to internal hernia is a rare phenomenon in adults particularly in patients with history of pulmonary tuberculosis, but commonly seen in pediatric population. Mostly it occurs along the duodenum in the paraduodenal recesses. The patient might be misdiagnosed as having obstruction secondary to strictures formed as a result of intestinal tuberculosis and pose delay in exploration.**Case Report:** We describe an adult patient who presented with intestinal obstruction by a tourniquet or ring formed between the tip of appendix and ileocecal junction through which small bowel herniated, strangulated and finally perforated before exploration, initially thought to be due to intestinal tuberculosis. He underwent exploratory laparotomy and was release of obstruction, appendectomy and resection of bowel. The patient tolerated the procedure well and discharged in stable condition.**Conclusions:** Intestinal obstruction due to internal hernia is rare in adults. Computed tomography abdomen can diagnose the condition; however, exploration of the abdomen can give the definite diagnosis and tailor the appropriate therapy.**MeSH Keywords:** Appendix • Intestinal Obstruction • Laparotomy**Full-text PDF:** <https://www.amjcaserep.com/abstract/index/idArt/920384>

Background

Internal hernia has an overall incidence of less than 1%, it constitutes up to 5.8% of small bowel obstructions, which, if left untreated can lead to high mortality rate exceeding 50% if strangulation is present [1,2]. Very few cases have been reported in the literature in which internal herniation occurred through a tourniquet or ring formed by the adhesions of the appendicular tip to ileocecal region or to the base entrapping loops of small bowel resulting in acute intestinal obstruction. Intestinal obstruction secondary to appendiceal pathology is quite uncommon [3–6]. We report the case of an adult who presented with acute intestinal obstruction and found to have appendicular tourniquet and internal herniation of small bowel [7].

Case Report

This case report is of a 24-year-old male patient with no comorbidities or previous abdominal surgery, who presented with 3 days of colicky abdominal pain in the peri-umbilical area associated with projectile vomiting and anorexia. He was obstipated for 2 days although there was no history of nausea, rigors, or weight loss and this was the first time to have this presentation. He was treated for pulmonary tuberculosis and the therapy ended 2 months ago.

He was conscious, alert, and not in pain. His vitals were within normal limits. His abdomen was mildly distended, with no scars, with mild tenderness on right lower quadrant but without rebound tenderness. There was no sign of peritonitis. His bowel sounds were audible. Digital rectal examination revealed empty rectum, however, no mass or bleeding was appreciated. Nasogastric tube aspirated around 150 mL of greenish fluid.

Blood works showed a white cell count of 11.6 (range, 4000–7000) and hemoglobin was 13.7 g/dL (range, 12–16 g/dL) whereas biochemistry was normal. X-ray abdomen (Figure 1) at the time of presentation showed multiple air fluid levels with no air under diaphragm. Computed tomography (CT) abdomen and chest with oral and intravenous (IV) contrast showed (Figure 2) dilatation of the small bowel loops to the level of the distal ileum, suggestive of small-bowel obstruction, and multiple enlarged, mesenteric, retroperitoneal/para-aortic and peripancreatic necrotic lymph nodes suggestive of tuberculosis with tuberculous lymphadenitis. The patient was admitted as a case of intestinal obstruction and started on IV fluids and nasogastric decompression, with the impression of obstruction secondary to intestinal tuberculosis. He was examined serially every 4 hours for development of any new signs and a repeat abdominal x-ray that was performed after 12 hours (Figure 3) showed free air under diaphragm. A mid-line laparotomy was performed, about 1.5 L of hemorrhagic

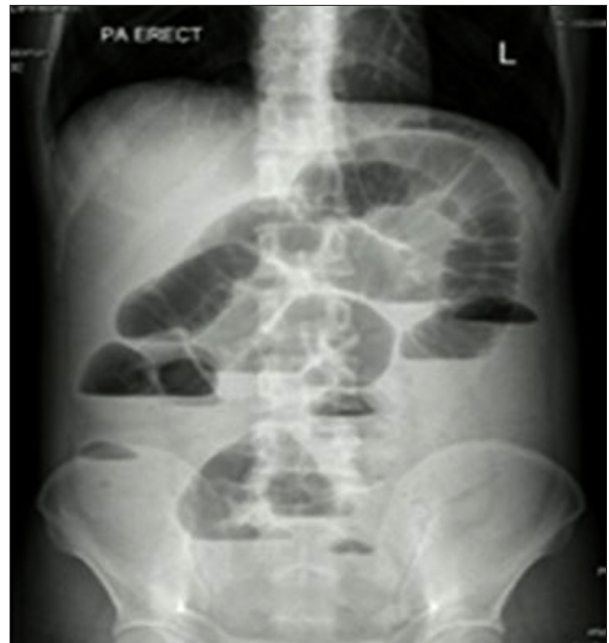


Figure 1. Abdominal x-ray showing multiple air fluid levels.



Figure 2. Computed tomography abdomen with contrast showing dilated jejunum with non-progression of contrast.

fluid and bowel contents were evacuated from the abdominal cavity. The small bowel was distended till the ileocecal junction and tip of appendix was attached to ileocecal valve forming a tourniquet/ring around the loop of small intestine causing complete obstruction. Ileal perforation was seen 80 cm proximal to ileocecal junction, at mesenteric border, around 1 cm in diameter with dusky dilated small bowel (Figure 4). Appendectomy was done after releasing the tip from the ileocecal valve and resection of the ileum bearing the perforation with side to side anastomosis with stapler was accomplished.

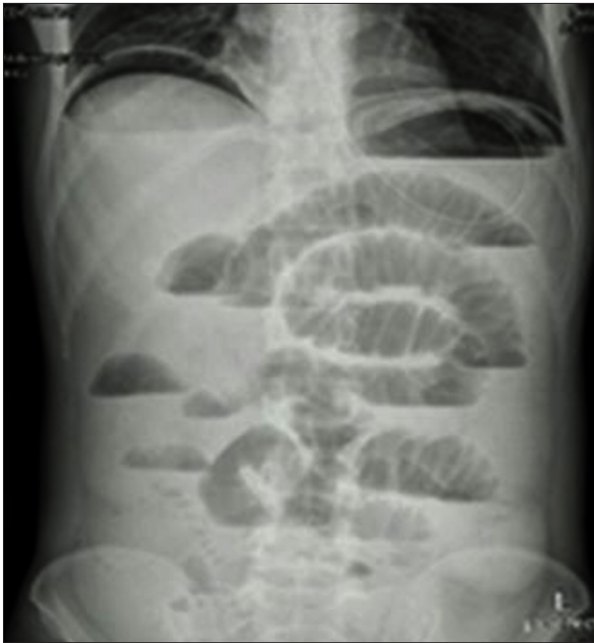


Figure 3. Abdominal x-ray showing free air under diaphragm.

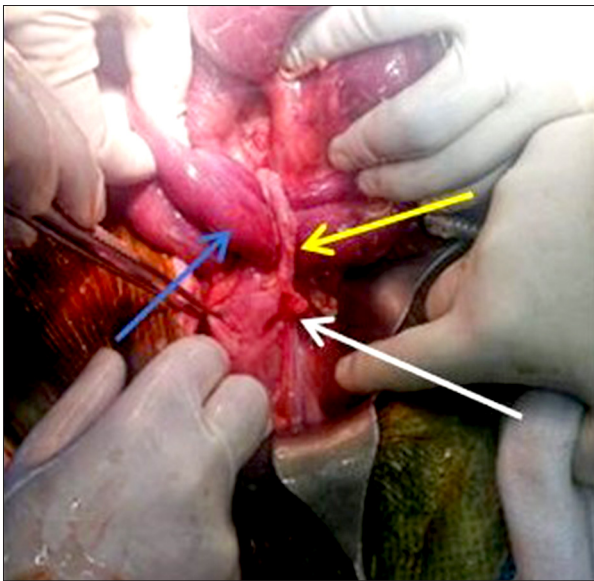


Figure 4. White arrow cecum, Yellow arrow appendix forming a ring, Blue arrow ileum loop herniating through appendicular ring.

Histopathology of small bowel segment revealed submucosal edema, hemorrhage, serositis with granulation tissue formation, consistent with perforation, whereas the appendix showed only peri-appendicitis. The postoperative course was complicated by superficial wound infection which was treated at the hospital and discharged home. He was doing well at 1 and 4 weeks of follow up at the clinic.

Discussion

Internal hernia is a rare cause of intestinal obstruction so a high index of suspicion should be kept in mind specially in young healthy patients with no previous history of abdominal surgeries. There are no radiological features sensitive or specific for internal hernias [7]. The main types of internal hernia as traditionally described by Meyers [8] are based on location. Specifically, using historical data, these consist of paraduodenal (53%), pericecal (13%), foramen of Winslow (8%), transmesenteric and transmesocolic (8%), intersigmoid (6%), and retroanastomotic (5%) with the overall incidence of internal hernias being 0.2% to 0.9% [7].

Hotchkiss first described 3 cases of intestinal obstruction related to appendiceal cause in 1901 [9]. Soo and Tseghe [10] and Makama et al. [3] have classified intestinal obstruction due to appendix into the paralytic ileus, mesenteric ischemia, obstruction without strangulation, and lastly the mechanical occlusion by strangulation, and the first case was published by Naumov [11] in 1963. Appendicular tourniquet is the formation of a ring/loop by the adhesion of its tip to ileocecal junction secondary to inflammation. To date, 17 cases have been described in literature by Ismail [16] and Chowdhary [6]. Adhesion of the appendicular tip are formed by the inflammation of appendix itself or may result from peritoneal reaction [10]. X-ray abdomen can be helpful in diagnosing intestinal obstruction but CT scan can provide further details regarding site and sometimes the causative lesion but in this rare entity of appendicular tourniquet the definite diagnosis can only be made on exploring the abdomen as happened in our patient [11].

Laparoscopic exploration is becoming the standard of care in cases of intestinal obstruction as it is safe, effective, and advantageous over open surgery [12,13]. Benefits offered by laparoscopy are less pain, good postoperative outcomes, less morbidity, lower chances of post-operative ileus and early discharge [12], although it may not be appropriate for all patients as there is less working space in distended bowel and more chances of bowel injury and morbidity in addition to advanced laparoscopic skills [14]. Exploratory laparotomy remains the choice in all the cases where laparoscopic surgery cannot be performed although now it is becoming less common [15]. Release of obstruction, appendectomy and/or resection of dead bowel remain standard of care after exploration either open or by laparoscopy [3–6,9–11].

Conclusions

Internal hernia by appendiceal tourniquet/ring is extremely rare. Diagnostic dilemma can arise due to past history of pulmonary

tuberculosis. The patient present with sign and symptoms of intestinal obstruction and high index of suspicion should be kept in patients with no prior surgical history. Treatment is by exploration either by laparoscopy or open surgery, release of obstruction, appendectomy with or without bowel resection.

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Conflict of interest

None.