

Volvulus of ileum: A rare case of small bowel obstruction and the effectiveness of abdominal ultrasound imaging for the diagnosis

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Abstract

Primary type small bowel volvulus is observed mainly in children and young adults, whereas the secondary type is usually found between the ages of 40 and 90 years and is mainly due to adhesions after previous surgery: tumors and mesenteric lymph nodes can also be responsible for the secondary type. Diagnosis is difficult and the computed tomography scan is the most relevant imaging modality. For this reason we believe that the case presented in which diagnosis was primary made by abdominal ultrasonography and then confirmed first by computed tomography scan and definitively by surgical exploration is worth reporting.

Introduction

Small bowel volvulus is a rare cause of intestinal obstruction and is defined as the torsion of a segment of the bowel around its vascular axis without any predisposing anatomical abnormalities and can occur at any age, usually in males.¹

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dren and young adults, whereas the secondary type is usually found between the ages of 40 and 90 years¹ and is mainly due to adhesions after previous surgery:² tumors³ and mesenteric lymph nodes can also be responsible for the secondary type.⁴ Diagnosis is difficult and the computed tomography scan (CT) is the most relevant imaging modality.⁵ For this reason we believe that the case presented in which diagnosis was primary made by abdominal ultrasonography (US) and then confirmed first by CT and definitively by surgical exploration is worth reporting.

Case Report

A 32-year-old African woman was admitted to the Emergency Department with acute abdominal pain of 12 hours duration associated with nausea and vomiting. Her past medical history revealed sickle cell anemia, recurrent episodes of abdominal pain after ingestion of milk and milk derivatives, and both caesarean section and a left ovariectomy due to a dermoid cyst. The patient had normal vital signs and physical investigation revealed diffuse pain, but no guarding or rebound tenderness with bowel sounds markedly reduced. She was afebrile. Laboratory findings were normal; in particular, the white cell count was normal as was the C-reactive protein level. Abdominal radiography showed dilated intestinal loops suggesting intestinal obstruction (Figure 1). A US showed dilated fluid-filled small bowel loops greater than 2.5 cm in diameter and the presence of free abdominal fluid between the intestinal loops (Figure 2). The US showed the twisting of small bowel around its mesentery (Figure 3). Considering this small bowel obstruction, a contrast-enhanced CT scan was performed and revealed a reduced intestinal parietal contrast-enhancement and the presence of the whirlpool sign that is seen when the bowel rotates around its mesentery leading to whirls of the mesenteric vessels (Figure 4). Surgery was required because of the suspicion of small bowel ischemia secondary to strangulation. Emergency laparoscopic surgery revealed a >180-degree clockwise rotation of the whole small bowel with initial ileal ischemia and adherence of the previous gynecological operation. The ileus was devolvulated with subsequent rapid resumption of the vitality of the intestinal loop and no bowel resection was necessary; in addition, the adherence was removed. The patient recovered her bowel movement in the course of the following two days, her postoperative course was uneventful and she was discharged from hospital and went home 5 days after surgery.

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Discussion and Conclusions

The most common site of volvulus is the colon, but small bowel volvulus is rare and only very few cases have been reported worldwide.⁶ In a retrospective study carried out in the United

States, small bowel volvulus represents 1% of hospitalizations for bowel obstruction and the mortality rate was about 6%.² Others have reported a higher mortality rate ranging from 10 to 35%, which increases to 20-100% when gangrenous bowel is present.^{1,4} The mortality rate is higher in those patients with previous abdominal surgery and cardiopathies.⁷ The recurrence rate is 3.9% and is usually associated with simple devolvulation.⁷ There are two types of small bowel volvulus in adults; the primary type volvulus characterized by no apparent predisposing anatomical abnormalities and the secondary type due to congenital or acquired lesions as in our case.⁷

The physiopathology of primary type small bowel volvulus is still unclear. Risk factors include a long small bowel attached to a broad based⁸ probably due to ingestion of a large volume of fiber-rich food after long periods of fasting or on an empty bowel.⁹ The secondary type bowel volvulus is mainly due to post-surgical adhesences or other diseases such as tumors which are able to cause a rotation of the intestinal loop.⁷ Diagnosis may be difficult because symptoms are nonspecific.² A recent history of intermittent, recurring abdominal pain that occurs after ingestion of a meal could direct the diagnosis² but in our case the presence of lactose maldigestion has probably complicated the diagnosis of previous pain episodes. The abdominal pain is variable and it is characterized as crampy, constant or intermittent and it becomes more intense if complications such as bowel ischemia or perforation appear.¹⁰ No laboratory findings¹¹ are specific as in our case. Imaging is most important because plain X-rays may suggest bowel obstruction,² but at present the abdominal CT scan is the preferred diagnostic imaging approach.^{7,12} The *whirl sign* seems to be typical of this illness and reveals the small bowel wrapped around a twisted superior mesenteric artery, creating a whirl-like appearance, as in our patient's case.⁵ In order to avoid mesenteric ischemia and gangrene, early recognition of this disease is essential² and several therapeutic options have been proposed even if surgical devolvulus and mesenteric decompression remains the main treatment to avoid necrosis, prevent intestinal resection, and improve outcomes.² Non-operative management has been carried out especially in patients unfit for surgery, but the mortality rate is

high.^{2,7} In conclusion, even if has been suggested that abdominal X-rays and ultrasound scans might not clearly show any specific findings in most cases,¹³ in the present case we confirm a previous report by Trevisani *et al.*,¹⁴ that US is useful for the diagnosis of small bowel volvulus and may be added to the imaging techniques for an early diagnosis of acute small bowel volvulus in adults.

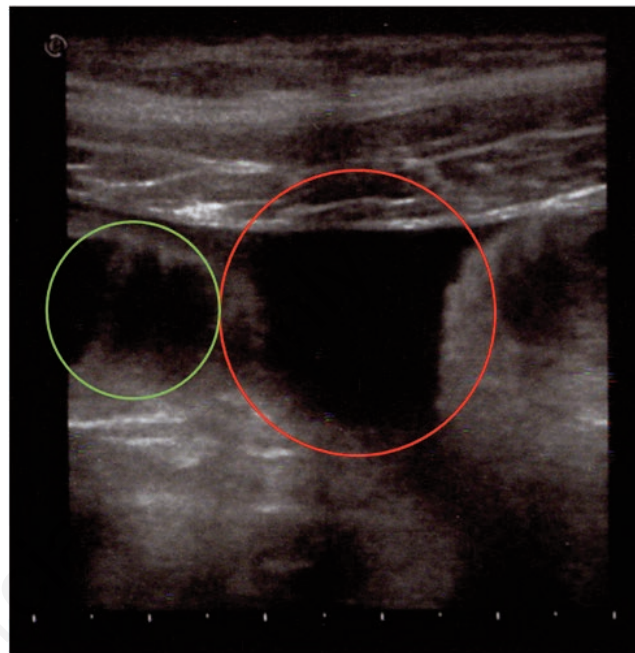


Figure 2. Abdominal ultrasonography: dilated fluid-filled loops greater than 2.5 cm in diameter of the small bowel (green circle) and presence of free abdominal fluid between the intestinal loops (red circle).

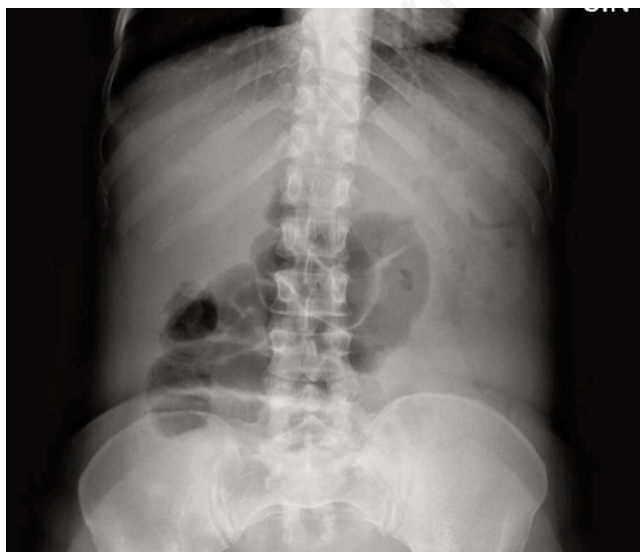


Figure 1. Abdominal X-ray: dilated bowel loops with gas and fluid levels indicating a small bowel obstruction.

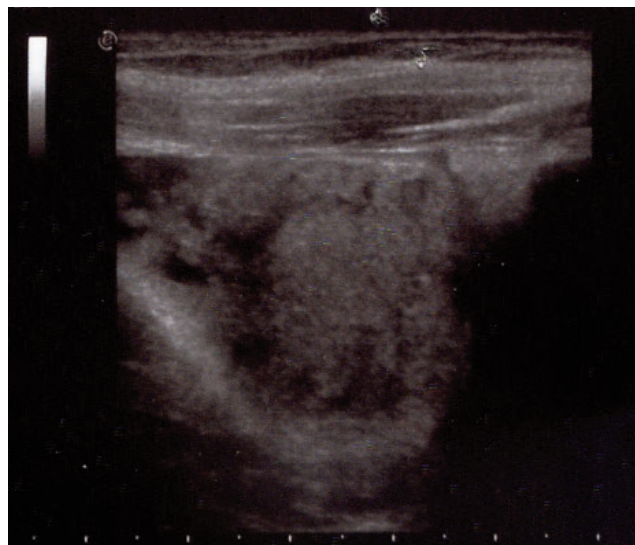


Figure 3. Abdominal ultrasonography: shows the twisting of small bowel around its mesentery.

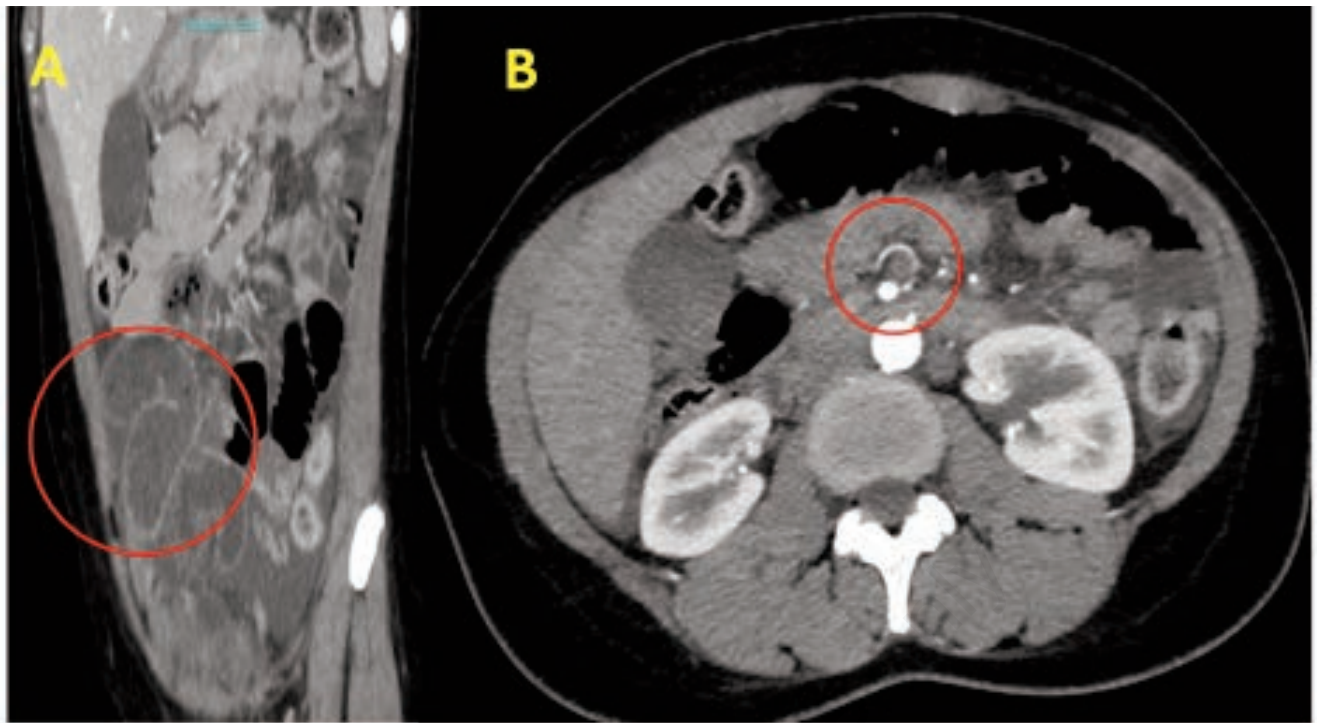


Figure 4. Abdominal contrast-enhanced computed tomography scan. (A) In the right part of the abdomen indicated by a red circle a dilation of the ileal loop is shown with the presence inside the loop of fluids and stools; reduced parietal uptake of contrast medium is also present indicating vascular damage. (B) Presence of the whirlpool sign (red circle) *i.e.* distended small bowels encircling the mesenteric artery or its branches.

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