Colonoscopic decompression of childhood sigmoid and cecal volvulus

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ABSTRACT

Cases of colonic volvulus in children are infrequently described in the literature. Here we describe the case of three patients with colonic volvulus. The first patient was a 10-year-old girl with abdominal dilation and pain and no bowel movement for 48 h. Her abdominal X-ray showed the coffee bean sign adjacent to the diaphragm, which was compatible with a diagnosis of cecal volvulus. The second patient was a 4-year-old boy with a history of chronic constipation during the past year and with no bowel movement for 24 h. Clinical manifestations included severe nausea, vomiting, and abdominal distension. His abdominal X-ray demonstrated the coffee bean sign in the right upper quadrant with upward convexity corresponding to a diagnosis of sigmoid volvulus. The third patient was a 10-month-old male who presented with excessive crying, malnutrition, and no bowel movement for 36 h. His abdominal X-ray demonstrated the coffee bean sign in the left upper quadrant with upward convexity. The presence of gas was not observed in the distal obstructed region, corresponding to a diagnosis of sigmoid volvulus. All three patients successfully underwent colonoscopy for volvulus reduction. Volvulus did not reoccur in any of the patients within 6 months of follow-up. It is recommended to perform abdominal X-ray imaging in patients who present with abdominal pain and distension, diarrhea, or constipation for possibly diagnosing volvulus.

Keywords: *Intestinal volvulus, intestinal obstruction, stomach volvulus*

INTRODUCTION

Volvulus is a condition in which the colon twists around itself and the mesentery. It may resolve spontaneously, but it usually causes intestinal obstruction, which can lead to strangulation, gangrene, and perforation. Chronic constipation may cause excessive colon enlargement that will cause volvulus, particularly if the mesenteric base is narrow. The symptoms of volvulus are similar to those of acute obstruction. Patients present with abdominal distension, nausea, and vomiting. The condition rapidly progresses to generalized abdominal pain and tenderness (1,2). Volvulus occurs in the sigmoid colon in more than 90% of cases, but it can also involve the cecum or transverse colon in approximately 20%-40% of cases (1,3).

Sigmoid volvulus can often be differentiated from transverse colon or cecal volvulus by means of performing abdominal X-ray imaging. Sigmoid volvulus presents as an inner tube or with a coffee bean sign with convexity to the right upper quadrant (RUQ) (opposite side of the obstruction). Gastrografin enema reveals narrowing of the obstruction, which creates a pathognomonic appearance of a bird's beak sign (4). Except for patients with clear signs of gangrene or peritonitis, primary treatment of sigmoid volvulus is resuscitation of patients and then colonoscopic volvulus reduction. Although these techniques are successful in terms of reducing sigmoid volvulus in most patients, the risk of recurrence is high. In case of gangrene or perforation, emergency laparotomy should be performed.

Cecal volvulus occurs due to a motile right colon. Rotation occurs around the ileocolic artery, impairing blood supply. Simple abdominal X-ray imaging reveals a renal-shaped air-filled structure in the left upper quadrant (LUQ), and gastrografin enema proves the presence of obstruction at the site of volvulus (1,5). Transverse colon volvulus is extremely rare in childhood. Colon stagnation and chronic constipation along with megacolon may cause transverse

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colon volvulus. The radiologic view of transverse colon volvulus is similar to that of sigmoid volvulus; however, gastrografin enema has revealed that the obstruction site is more proximal than its actual location. Although volvulus can sometimes be successfully decompressed by colonoscopy, most patients require emergency laparotomy and resection. In this case series, the cases of three patients with colonic volvulus presenting to the pediatric ward of Amir-Al-Momenin Hospital of Zabol city in the south-east of Iran have been introduced and discussed. Ethical considerations of the Helsinki Declaration were followed.

CASE PRESENTATIONS

We have presented three cases of volvulus in two children aged 10 years and 4 years and in one 10-month-old neonate. Informed consent was obtained from the parents of all three patients. A clinical examination was performed during a rectal examination. The patients' vital signs were normal. Laboratory examinations revealed normal levels of acute-phase reactants, including C-reactive protein levels, erythrocyte sedimentation rate, and white blood cell count. Before colonoscopy, the patients stayed in fasting condition (nil per os; NPO, nothing through the mouth). They were administrated with intravenous electrolytes and antibiotics. They were closely monitored until 24 h after the procedure.

First case: Cecal volvulus

The patient was a 10-year-old girl who had complained of abdominal dilation, pain, and no bowel movement for the past 48 h. The pain was continuous. During her physical examination, severe abdominal distension with a mass touchable in abdomen in the LUQ section, was detected. An abdominal X-rays was obtained, in which the coffee bean sign was observed with convexity to the diaphragm (Figure 1a). The patient who was diagnosed with cecal volvulus underwent colonoscopy, and volvulus reduction was performed. Then, another abdominal X-ray was obtained from the patient, which showed volvulus correction (Figure 1b). The patient was monitored for 24 h. Abdominal distension was reduced, and the patient was discharged in a good general condition.

Second case: Sigmoid volvulus

The patient was a 4-year-old boy with a history of chronic constipation for about 1 year; he presented with complaints of lack of bowel movements for the past 24 h. The

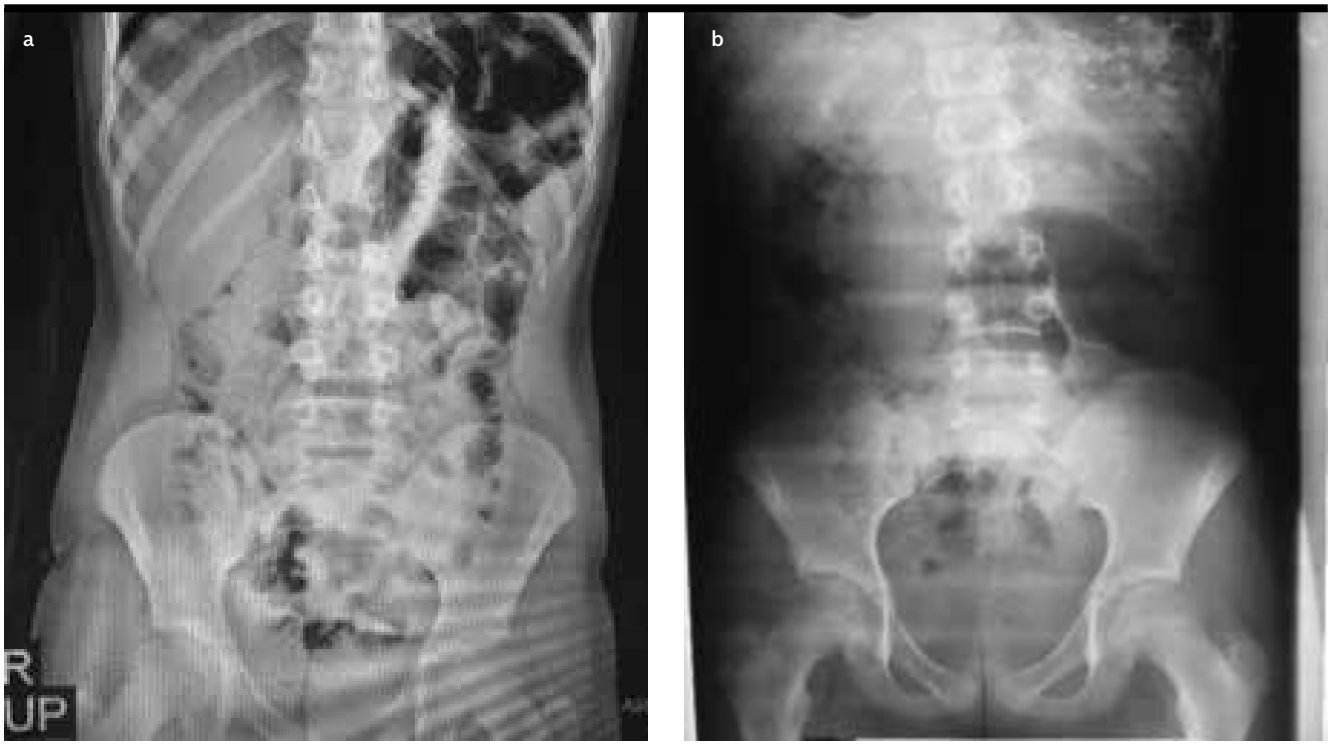

Figure 1. a, b. X-ray of a 10-year-old girl with cecal volvulus: before colonoscopy, the coffee bean sign was observed with convexity to the diaphragm (a); intestinal radiography after correcting the defect through colonoscopy (b)

patient also presented with severe nausea and vomiting. The patient's pain was continuous; thus, he had to be sedated. There were no signs of peritonitis or free abdominal air. During his physical examination, we found relative abdominal dilatation along with generalized tenderness. On performing a rectal examination, the ampulla of the rectum was empty. His abdominal X-ray showed the coffee bean sign in the RUQ section with upward convexity (Figure 2a). Then, the patient who was diagnosed with sigmoid volvulus underwent colonoscopy and volvulus reduction; later, another abdominal x-ray was obtained (Figure 2b). The patient was monitored for 24 h. Abdominal distension resolved, and the patient was discharged in a good general condition.

Third case: Sigmoid volvulus

The patient was a 10-month-old male who presented with restlessness, excessive crying, severe malnutrition due to poor nutrition, and lack of bowel movement for the past 36 h. During his abdominal examination, we identify a mass touchable in the LUQ . An abdominal X-ray was obtained from the patient, in which the coffee bean sign was observed in the LUQ section with upward convexity, indicating sigmoid volvulus. The presence of gas was not observed in the distal obstructed region (Figure 3a). A second abdominal X-ray was obtained from the patient, which showed that the obstruction was removed and that the air was observed along the entire length of the colon (Figure 3b). The patient was monitored for 24 h. Abdominal distension was obviated, and the patient was discharged in a good general condition.

DISCUSSION

In this report, we presented the cases of colonic volvulus: two boys (one was 4 years old and the other was 10 months old) and one girl (10 years old). Two patients had sigmoid volvulus and one had cecal volvulus. The age at colonic volvulus onset in children varies from 10 weeks to 17 years old (2,6,7). In previous reports, it has been stated that there is a higher number of male children, among patients diagnosed with colonic volvulus (6,8). From the three reported cases here, two were males. While small intestine rotation is a common phenomenon in children, large intestine twisting in children is rarely caused by colonic volvulus (6,9). Similar to adults, malrotation in children is also most commonly observed in the sigmoid colon, while in cecal volvulus, it is seen in 20%-40% of cases (3).

Figure 2. a, b. X-ray of a 4-year-old boy with sigmoid volvulus: before colonoscopy, the coffee bean sign was observed in the right upper quadrant with upward convexity (a); after colonoscopy (b)

Risk factors associated with volvulus are previous surgery, intermittent constipation, neuromuscular disorders, and congenital anomalies (1,6,8,10). While rotation in the cecum may be triggered by long-term distention or constipation or surgical procedures, sigmoid volvulus generally results from an unstable/motile sigmoid colon. In 18% of children with sigmoid volvulus, the condition may be detected in the context of Hirschsprung disease (9). Colonic volvulus is life-threatening condition in which a twisted portion of the colon may result in severe ischemia, perforation, and necrosis. Furthermore, gangrenous lesions may occur in as many as 80% of patients with sigmoid volvulus (7). Despite being a rare cause of childhood intestinal obstruction, clinicians should consider colonic volvulus in those with suggestive clinical signs and symptoms.

Radiologic studies are mandatory for making a diagnosis as clinical symptoms are non-specific. The most common imaging methods are abdominal X-ray imaging, contrast enema, and computed tomography (11). In the first case we presented, the coffee bean sign was convex to the diaphragm, which was compatible with a diagnosis of cecal volvulus. In the second case, the abdominal X-ray revealed the coffee bean sign in the RUQ region with upward curvature, corresponding to a diagnosis of sigmoid volvulus. In the abdominal X-ray in the third case, the coffee bean sign was detected in the LUQ with an upward curvature and there was a lack of gas in the distal part of the obstruction. Although barium contrast enema is the most sensitive diagnostic procedure for colonic volvulus (12), plain X-ray imaging is fast and affordable, with a low radiation dose. Specific signs that are highly indicative of cecum, sigmoid, or transverse colon volvulus (i.e., kidney been sign, coffee bean sign, and inverted coffee been sign) can be seen in abdominal X-rays (13). Although the classical coffee bean sign on performing X-ray imaging is a specific diagnostic feature, only 30% of patients may have this sign (9). In a survey of 19 patients with colonic volvulus, only two had the coffee bean sign in their abdominal X-rays (8). Other diagnostic characteristics of colonic volvulus in X-rays are an airless rectum and a dilated apical colon (8), which were also observed in the third case described here. The last two features are particularly sensitive markers; nevertheless, their specificity is low (11). Based on these,

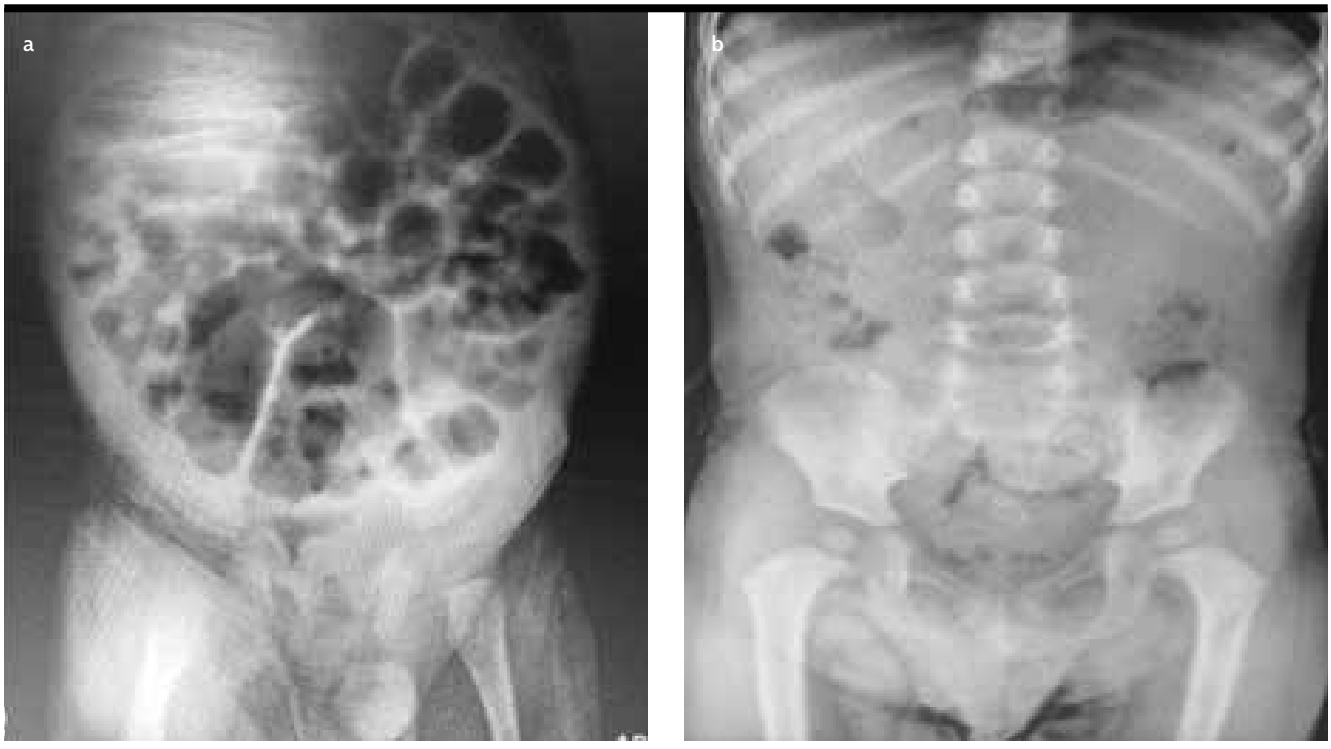

Figure 3. a, b. X-ray of a 10-week-old infant with sigmoid volvulus: before colonoscopy, the coffee bean sign was observed in the left upper quadrant with upward convexity, indicating sigmoid volvulus (no gas is observable in the distal obstructed region) (a); after colonoscopy, no volvulus was seen (b)

abdominal X-ray imaging is generally used as the primary screening method in patients in whom volvulus is suspected.

There is no single widely accepted strategy for resolving childhood colonic volvulus, although endoscopic reduction generally is among the first-line approaches. Despite the fact that surgical intervention is a curative approach for colonic volvulus, this procedure is invasive. Surgical intervention is generally considered for transverse colon volvulus (9). On the other hand, colonoscopy may be associated with a high risk of recurrence (11). Because of the stable clinical conditions of our patients, the defects were corrected through colonoscopy . In a 6-month follow-up, none of our patients experienced volvulus recurrence or any colonoscopy-related complication. Necrosis, mucosal ulceration, or dark blood revealed by endoscopy suggests strangulation and necessitates performing surgery. If a gangrenous bowel is found during laparotomy, sigmoid colectomy with end colostomy (Hartmann procedure) is the best surgical technique for treatment (14). However, it seems that in uncomplicated cases, colonic volvulus can be effectively corrected by minimally invasive colonoscopy.

In conclusion, volvulus is an uncommon acute abdominal emergency, showing symptoms of bowel obstruction. Its diagnosis is usually based on the past history of patients and on the results of a simple abdominal examination. All patients with abdominal pain, colonic or abdominal distension, diarrhea, or constipation without a diagnosis of inflammatory bowel disease are recommended to undergo simple abdominal X-ray imaging to examine if volvulus is present. In cases when patient symptoms are stable and severe ischemia is not present, resection can be done through colonoscopy. Timely volvulus reduction and symptom resolution may prevent the recurrence of volvulus at least for 6 months. If left untreated, colonic volvulus may lead to intestinal ischemia and perforation, which are potentially fatal conditions; therefore, it is advisable to timely diagnose suspicious patients with long-term abdominal pain and distention.

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