Sigmoid Volvulus in a Healthy Adolescent Male

JOSEPH A. INGER, BS; CAITLIN AZZO, MD; KRISTIN H. DWYER, MD, MPH; ARTUR CHERNOGUZ, MD; LACHLAN DRIVER, MD

ABSTRACT

We report the case of a 15-year-old previously healthy male who presented with several days of progressive abdominal pain, vomiting, and anorexia. On arrival to the emergency department, he was hemodynamically stable. Patient's abdominal exam revealed a soft, benign abdomen with right-sided greater than left-sided tenderness. Cross-sectional imaging demonstrated sigmoid volvulus without evidence of pneumatosis, perforation, or free air. He underwent multidisciplinary evaluation by pediatric surgery and gastroenterology, and urgent endoscopic detorsion was performed. Pediatric sigmoid volvulus is rare, accounting for a small minority of large bowel obstructions in this age group. Symptoms may be nonspecific, and exam findings can appear reassuring despite the presence of a high-risk surgical emergency. This case highlights the importance of maintaining a broad differential diagnosis in adolescents presenting with abdominal pain and underscores the role of imaging and multidisciplinary collaboration in timely recognition and management.

KEYWORDS: adolescent abdominal pain; computed tomography; cross-sectional imaging; endoscopic detorsion; gastrointestinal volvulus; large bowel obstruction; pediatric sigmoid volvulus; pediatric surgery

INTRODUCTION

Sigmoid volvulus results from torsion of the sigmoid colon around its mesenteric axis, leading to colonic obstruction and potential ischemia. While relatively frequently encountered in adult patients—particularly in elderly, institutionalized or constipated patients—it is exceedingly rare in patients under 18 years old, with fewer than 300 cases reported.[1] Pediatric presentations can be subtle, with abdominal pain, distention, or emesis that mimic functional gastrointestinal disorders. Delayed diagnosis risks bowel ischemia, necrosis, or perforation, leading to increased morbidity.[2]

We present the case of a previously healthy 15-year-old male who developed sigmoid volvulus, which was managed with urgent endoscopic intervention. This case demonstrates the diagnostic challenge of sigmoid volvulus in the pediatric population and emphasizes the importance of early imaging and multidisciplinary management.

CASE PRESENTATION

A 15-year-old previously healthy male presented with four days of progressive abdominal pain. The pain began as intermittent, diffuse discomfort but escalated in severity, radiating around the waist and to the lower back, more prominent on the right side. By the time of presentation, the patient's pain intensity had reached 8/10 and he had limited prolonged ambulation. He also reported two episodes of non-bloody, non-bilious emesis, mild watery diarrhea, and reduced appetite. He denied fever, chills, hematochezia, or dysuria.

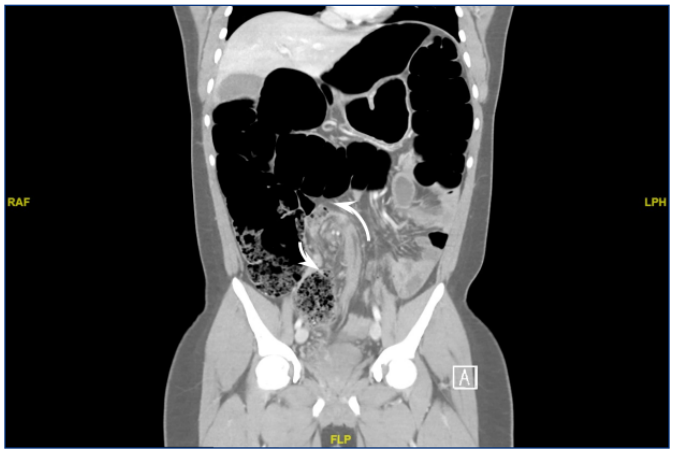
He had no significant past medical or surgical history. He was not taking medications, had no known allergies, and there was no family history of gastrointestinal disease. He denied tobacco, alcohol, or drug use. He lived with his parents and attended school regularly.

On arrival to the emergency department, vital signs were notable for blood pressure 117/78 mmHg, heart rate 72 bpm, temperature 97.8°F, and oxygen saturation 97%.

Physical exam revealed an alert, non-toxic adolescent in no acute distress. Abdominal exam revealed a soft abdomen with mild right-sided greater than left-sided tenderness. There was no costovertebral angle tenderness. Cardiopulmonary and neurologic examinations were unremarkable.

Laboratory evaluation showed no leukocytosis (WBC 8.5 $\times 10^3/\mu L$), hemoglobin 16.3 g/dL, creatinine 0.9 mg/dL, and lactate within normal limits. Urinalysis demonstrated

Figure 1. Coronal contrast-enhanced CT image of the abdomen demonstrating "Whirl Sign" indicated by white arrows.



concentrated urine with mild proteinuria and microscopic hematuria but no pyuria. Liver function and lipase levels were unremarkable.

Computed tomography (CT) of the abdomen and pelvis with intravenous contrast revealed findings compatible with sigmoid volvulus with no evidence of pneumatosis, portal venous gas, or free air [**Figure 1**].

Pediatric surgery and gastroenterology were urgently consulted. Given the absence of peritonitis or ischemic signs, the decision was made to pursue endoscopic detorsion. Flexible sigmoidoscopy was performed with successful detorsion, resulting in decompression. The patient was admitted for observation and further surgical evaluation regarding definitive management to prevent recurrence. On hospital day three he underwent open resection of redundant sigmoid colon (55 cm) with primary rectosigmoid anastomosis. A rectal biopsy was performed with concern for Hirschsprung disease, showing no pathology. The patient experienced postoperative ileus with subsequent nasogastric decompression, tolerated regular diet on postoperative day 10, and was discharged on postoperative day 11.

DISCUSSION

Colonic volvulus accounts for 10–15% of all large bowel obstructions in the United States and Western Europe. Sigmoid volvulus is the most common type of colonic volvulus in both children and adults.[3] Incidence of colonic volvulus varies widely in different regions of the world, with endemic areas in regions of Africa, South America, Eastern Europe, and the Middle East, with volvulus accounting for 13% to 42% of all intestinal obstructions.

Sigmoid volvulus is most common in elderly adults with predisposing factors such as chronic constipation, diabetes, and neuropsychiatric illness, potentially leading to reduced autonomy, prolonged bed rest, or institutional placement.[3] In contrast, pediatric and adolescent sigmoid volvulus is rare, and recognition can be delayed due to its nonspecific presentation.[4]

Epidemiology and risk factors

From case reports, predisposing risk factors have included late onset Hirschsprung disease, history of chronic constipation, neuromuscular disorders (cerebral palsy, myopathy, and Prader-Willi syndrome), anatomic variants such as dolichosigmoid and infections such as *Ascaris lumbricoides* (roundworm) infestation or Chagas disease in tropical areas.[3,5-7]

Many cases, however, as in our patient, occur in otherwise healthy children without clear predisposing conditions.[1,4,8] From a systematic review of pediatric sigmoid volvulus case reports, two incidence peaks were identified: the first within the first six months of life and the second during the school-age years. Multiple reviews also reported a higher prevalence in male patients, with male-to-female ratios ranging from 2.3:1 to 3.5:1.[1,4]

Clinical features

Symptoms of sigmoid volvulus include abdominal pain, distention, nausea, vomiting, and constipation or diarrhea. Physical examination may be deceptively benign, with minimal tenderness despite advanced disease.[4,9] In this case, the patient's abdomen remained soft and only mildly tender despite radiologic evidence of volvulus. Notably, the patient continued to have episodes of diarrhea, highlighting that clinical signs of complete obstruction were absent despite significant pathology.

Diagnosis

Imaging plays a crucial role in diagnosis. Abdominal radiographs may show the "coffee-bean" sign, formed through the progressive distention of the closed loop of the sigmoid colon with gas, leading to apposition of the medial walls of the dilated bowel,[10] while CT can demonstrate the whirl sign of twisted mesentery.[2,10] In pediatric patients, CT is typically reserved for cases with uncertain diagnosis, with efforts made to limit radiation exposure. When performed, CT can help identify complications such as free intra-abdominal fluid or gas, thereby guiding appropriate management decisions.[1]

Management

In stable pediatric patients without signs of ischemia or perforation, first-line therapy is endoscopic detorsion via flexible sigmoidoscopy or colonoscopy.[11] Recurrence is common, however, and elective sigmoid resection is often recommended to prevent recurrence and future complications.[8] Surgery is mandatory in cases of failed detorsion, peritonitis, or gangrenous bowel.[11,12]

Initial clinical presentation and availability of endoscopic expertise dictates the urgency of surgical intervention. Hemodynamically stable patients with radiographic signs of sigmoid volvulus should undergo an urgent colonoscopic decompression. Placement of a rectal tube at the conclusion of the procedure can help prevent an early recurrence of the volvulus, but does not commit to definitive partial colectomy. While endoscopic decompression is typically successful in resolving the volvulus, it can do little to prevent recurrence (up to 57%).[1] Unfortunately, no specific predictors of recurrence have been identified and the presence of a redundant sigmoid colon is a risk for recurrent volvulus. Therefore, elective resection of the redundant sigmoid colon is generally recommended and well-tolerated. Nevertheless, definitive sigmoid resection can be occasionally avoided.[2,13]

Patients presenting with clinical and/or radiographic signs of bowel ischemia are not candidates for endoscopic decompression. Instead, urgent operative intervention should be undertaken and aimed at excision of the affected and redundant sigmoid colon. Primary restoration of bowel continuity should be the goal, provided that the patient is hemodynamically stable. However, a temporary fecal diversion

procedure is appropriate when bowel viability is in question or the patient cannot tolerate a lengthier procedure. In either case, the patient can be positioned in lithotomy, in order to facilitate access to the rectum and to enable the option of a transrectal end-to-end anastomosis after the resection of the redundant sigmoid portion. A rectal biopsy for Hirschsprung's disease (reported to be present in up to 17% of cases) is frequently, albeit not routinely, performed.[1,4]

CONCLUSION

Although rare, sigmoid volvulus should be considered in adolescents presenting with abdominal pain and vomiting, even when physical examination is reassuring. Prompt recognition, imaging, and collaborative management are key to preventing life-threatening complications. This case illustrates the importance of broad diagnostic consideration in the pediatric emergency setting.

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Authors

Joseph A. Inger, BS, Warren Alpert Medical School of Brown University, Providence, RI.

Caitlin Azzo, MD, Department of Emergency Medicine, Warren Alpert Medical School of Brown University, Providence, RI.

Kristin H. Dwyer, MD, MPH, Department of Emergency Medicine, Warren Alpert Medical School of Brown University, Providence, RI.

Artur Chernoguz, MD, Department of Pediatric Surgery, Hasbro Children's Hospital, Warren Alpert Medical School of Brown University, Providence, RI.

Lachlan Driver, MD, Department of Emergency Medicine, Warren Alpert Medical School of Brown University, Providence, RI.

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Correspondence

Joseph A. Inger, BS
Warren Alpert Medical School of Brown University
222 Richmond St.
Providence, RI 02903
joseph_inger@brown.edu