

Endoscopic Reduction of Sigmoid Volvulus in a 15-Year-Old Male

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Zach Gohsman, MD¹, Albert Chan, MD¹,
and Michael K. Davis, MD¹ 

Abstract

Sigmoid volvulus is a well-recognized phenomenon in the elderly but rare in children. The proposed mechanism involves rotation of a redundant sigmoid loop around a narrow, elongated mesentery with subsequent vascular occlusion. The condition can be intermittent or may resolve spontaneously, complicating diagnosis. Early diagnosis is imperative to prevent ischemic complications including necrosis, perforation, and sepsis. Abdominal pain, abdominal distention, and vomiting are the most common presenting symptoms, however abdominal tenderness is uncommon. Colonic dilation is the most frequent finding on abdominal radiograph. Contrast enema reveals a “bird’s beak” configuration of the twisted colon and moreover, is successful in reducing the majority of pediatric cases. If there is no evidence of bowel ischemia or perforation, endoscopic reduction has been proposed as first-line treatment for sigmoid volvulus, especially in children. We report the case of 15-year-old male in which endoscopic reduction of sigmoid volvulus was successful without complication.

Keywords

sigmoid volvulus, endoscopy, child

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Case Report

A 15-year-old Caucasian male presented to the pediatrician’s office with a 1-day history of intermittent suprapubic abdominal pain. The pain was described as 7/10 maximum severity but, after a single dose of acetaminophen, significantly improved (1/10 in severity). There was no fever, vomiting, weight loss, constipation, or diarrhea. The patient recalled passage of a normal soft bowel movement without blood or mucus the day prior. There were no recent sick contacts or dietary changes. He was afebrile and vital signs were normal. Physical exam revealed a well-appearing male with a soft, non-tender, and non-distended abdomen. Bowel sounds were hyperactive. Testicular exam was normal and the patient was able to maneuver on and off the exam table without significant discomfort. Urinalysis revealed ketones 40 mg/dL but was otherwise unremarkable. The patient was sent home with presumed acute viral gastroenteritis and instructions to take acetaminophen every 4 hours as needed and to seek medical care for persistent or worsening symptoms.

Two days later he reported to the pediatric emergency department with moderate suprapubic cramping abdominal pain with radiation to the bilateral flanks. There was

associated nausea and 1 episode of non-bloody and non-bilious emesis. The patient had not had a bowel movement in 3 days. Vital signs included a blood pressure of 132/87, temperature 36.6°C (97.9°F), heart rate 87, and respiratory rate 16. Physical exam revealed an uncomfortable-appearing child with moderate tenderness in all 4 abdominal quadrants. Bowel sounds were hypoactive and there was moderate abdominal distention. A complete blood count, urinalysis, C-reactive protein, lipase, coagulation studies, and lactic acid were unremarkable. Complete metabolic panel was normal except for hyperglycemia (156 mg/dL). SARS-COV-2 by NAA was not detected. Abdominal radiograph revealed a markedly distended inverted U-shaped bowel loop sigmoid colon or “coffee bean sign” (Figure 1). Computed tomography with 100 cc of Omnipaque 350 intravenous contrast revealed marked gas distention of the sigmoid colon and

¹University of Florida, Gainesville, FL, USA

Corresponding Author:

Michael K. Davis, Department of Pediatrics, Division of General Pediatrics, College of Medicine, University of Florida Health, 7046 SW Archer Road, Gainesville, FL 32608, USA.
Email: davismk@ufl.edu



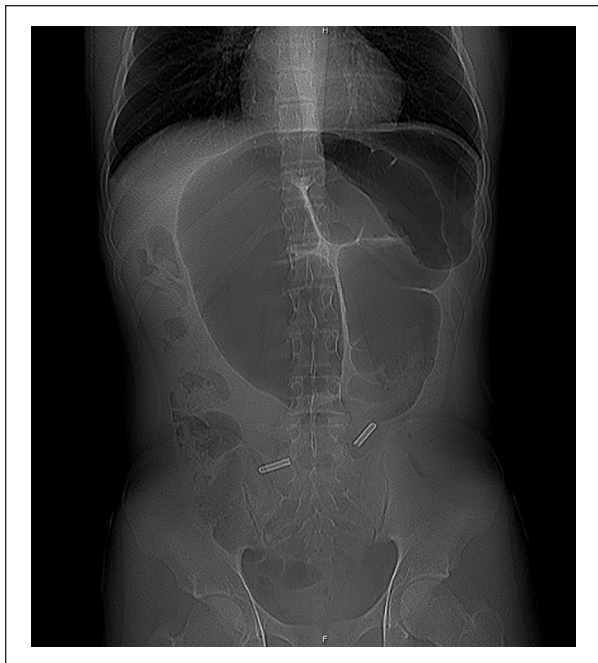


Figure 1. AP view plain radiograph reveals a markedly distended inverted U-shaped bowel loop sigmoid colon (coffee bean sign).

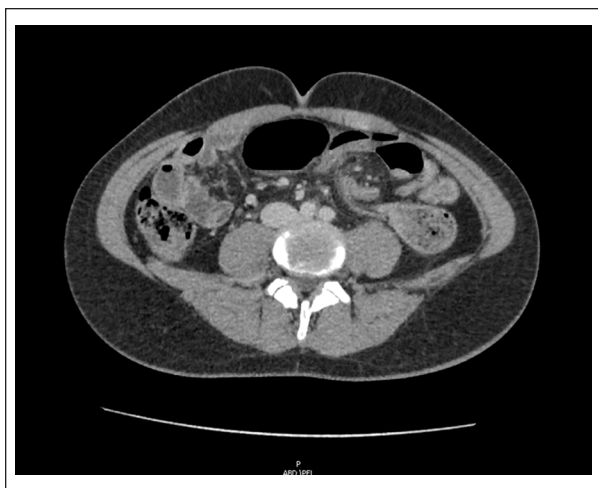


Figure 2. Computed tomography with intravenous contrast reveals a dilated air-filled sigmoid colon with the "whirlpool sign" indicating the sigmoid volvulus.

a "whirlpool sign" in the lower abdomen consistent with sigmoid volvulus (Figure 2).

A pediatric surgeon and pediatric gastroenterologist were consulted and jointly decided to attempt endoscopic reduction of the sigmoid volvulus with, should it become necessary, subsequent exploratory laparotomy. After obtaining informed consent and induction of general anesthesia, an Olympus PCF-H190DL colonoscope

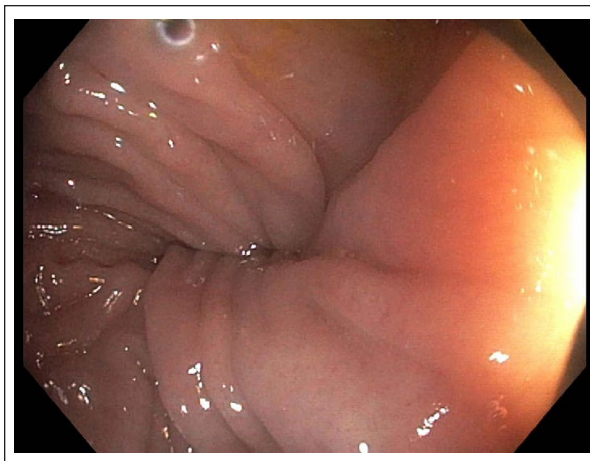


Figure 3. Endoscopic view of sigmoid volvulus.

was passed under direct visualization through the anus to the sigmoid colon where the colonic mucosa demonstrated a twisted appearance (Figure 3). Detorsion of the volvulus was achieved with careful insufflation and gentle pushing, and confirmed by passage of stool along with visualization of grossly dilated descending colon. Further inspection revealed normal mucosa; due to presence of stool, the colonoscopy was limited to the splenic flexure. A rectal tube was not placed during the procedure. The child was returned to the hospital ward in stable condition, tolerated standard advancement of the diet, and was discharged home the following day.

Discussion

Sigmoid volvulus occurs due to rotation of a redundant sigmoid loop around a narrow, elongated mesentery with subsequent vascular occlusion.¹ It is well-recognized in the elderly but rare in children.^{2,3} The condition can be intermittent or may resolve spontaneously, complicating diagnosis. Early diagnosis is imperative to prevent ischemic complications including necrosis, perforation, and sepsis. Data from adult populations reveals a high success rate with colonoscopy or hydrostatic de-volvulus but there is a high recurrence rate, such that elective surgical resection of the sigmoid colon is often recommended for definitive treatment.² Data in children reveal a high coincidence (up to 16%) of Hirschsprung's disease,^{3,4} and may present in the newborn period⁵ or later in life.³ Rarely, there is an association with imperforate anus, roundworm infection, or Cornelia de Lange.

Out of 63 reported cases in children, abdominal pain (67%), abdominal distention (56%), and vomiting (48%) were the most common presenting symptoms.³ Abdominal tenderness on exam was surprisingly uncommon (17%). Colonic dilation is the most frequent

finding on abdominal radiograph (27/45, 60%) and contrast enema reveals a “twisted taper” or “bird’s beak” configuration of the twisted colon. Salas et al reported that non-operative treatment was attempted in 28/63 (44%) and was successful in 17 (63%). Contrast enema successfully reduced sigmoid volvulus in 10 of 13 attempts (77%) but was felt to carry a risk of perforation and chemical peritonitis. This technique was deemed preferable in neonates with sigmoid volvulus as surgery and colonoscopy carry higher relative risk compared with older children.⁵ Salas et al³ further reported that detorsion by proctosigmoidoscopy and endoscopic rectal tube placement was successful in 15/28 (47%) attempts.

In adults there are 2 distinct clinical presentations of sigmoid volvulus: acute and chronic recurrent.¹ The acute presentation is more likely in children and more easily recognized, with sudden onset abdominal pain, abdominal distention, and vomiting. A delay in diagnosis is associated with substantial morbidity and mortality. The presence of gangrene can result in sepsis and shock.

If there is no evidence of bowel ischemia or perforation, endoscopic reduction has been proposed as first-line treatment for sigmoid volvulus, especially in children⁶ and this approach was successful in our case. Due to the high expected recurrence rate (35%),² elective surgery for sigmoid colon resection and primary anastomosis is recommended for adults, although the evidence for recurrence risk in children is lacking. Some recommend performing definitive semi-elective surgery during the initial hospital admission⁷ and others suggest waiting for recurrence.⁸ Performing a rectal biopsy in all surgical cases seems prudent based on the association with Hirschsprung’s disease. The need for IV fluid resuscitation and IV antibiotics can be determined by severity of the clinical presentation.

Author Contributions

ZG: contributed to conception or design; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy. AC: contributed to acquisition, analysis, or interpretation; critically revised the manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy. MKD: contributed to conception or design; contributed to acquisition, analysis, or interpretation; drafted the

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Ethical Approval and Informed Consent

The authors confirm that informed patient consent and institutional review board approval was obtained for publication of the case details.

Informed Consent

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ORCID iD

Michael K. Davis  <https://orcid.org/0000-0001-5585-727X>

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