A Rare Case of Total Colonic Volvulus

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ABSTRACT

Volvulus is a complete twisting of the colon around its mesenteric vasculature, significantly risking obstruction and advancement to ischemic bowel. The most common areas of volvulus are in the sigmoid and cecum; less commonly, volvulus can occur in the splenic flexure and the transverse colon. A rarer situation involves the simultaneous volvulus of the transverse and sigmoid colon. This case report describes a total colonic volvulus involving the terminal ileum to the junction of the descending and sigmoid colon. To our knowledge, only one other similar case has been reported in the English literature. This is the case of a 59-year-old Caucasian female who presented with gastrointestinal bleeding, hypotension, and abdominal pain. Computed tomography (CT) imaging showed colonic thickening with distention extending from the cecum up to the region of the descending-sigmoid junction, which was suggestive of volvulus. An exploratory laparotomy was performed, and infarcted bowel associated with volvulus involving the cecum, ascending colon, transverse colon, and descending colon down to the sigmoid junction was discovered. A subtotal colectomy and ileostomy was performed.

Volvulus involving two segments of the colon is a rare event that is diagnosed intra-operatively rather than through pre-operative physical exam and imaging as these modalities are often non-specific for diagnosing volvulus. It is important for the surgeon to consider the possibility of a volvulus involving more than one segment of colon because of the challenge it presents to the operation and to post-operative management. Regardless of suspected etiology of an acute abdomen, a patient presenting with peritonitis should always undergo an emergent exploratory laparotomy for diagnosis.

INTRODUCTION

Volvulus is a complete twisting of the colon around its mesenteric vasculature, significantly risking obstruction and advancement to ischemic bowel. Diagnosis of volvulus is challenging, because physicians may not initially suspect volvulus on their pre-operative assessment as volvulus is often diagnosed intra-operatively. The most common areas of volvulus are in the sigmoid (75%) and cecum (22%); less commonly, volvulus can occur in the splenic...
flexure (1-2%) and the transverse colon (2%).\textsuperscript{1,2} A rarer situation involves the simultaneous volvulus of the transverse and sigmoid colon.\textsuperscript{2} This case report describes a total colonic volvulus involving the terminal ileum to the junction of the descending and sigmoid colon. To our knowledge, only one other similar case has been reported in the English literature.\textsuperscript{3}

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**CASE PRESENTATION**

A 59-year-old Caucasian female presented to an outside hospital with a 1-day history of abdominal pain. She had a work-up and was transferred to the ED for gastrointestinal (GI) bleeding, hypotension, and abdominal pain. She admitted to having coffee ground emesis and melena. Patient was awake and responsive but found to be dehydrated, in renal failure, and septic shock. Past medical history and past surgical history were non-contributory to her current condition.

On abdominal physical exam, the patient had a distended abdomen, hypoactive bowel sounds, guarding, rebound tenderness, and tenderness to palpation. No organomegaly was noted. The patient also had mottling in the lower extremities, a central capillary refill of 4 seconds (normal=3 seconds), and pale mucosa. Patient’s vital signs included a temperature of 35.2° C, heart rate of 80 beats/minute, blood pressure of 90/50 mmHg, and a respiratory rate of 22 breaths/minute.

Laboratory results demonstrated a metabolic acidosis with respiratory compensation. On abdominal x-ray, dilated loops of bowel were present (Figure 1). CT imaging showed multiple air fluid levels within the small bowel and colon. There was colonic thickening and distension from the cecum to the region of the descending-sigmoid junction. The colonic thickening and distension was suggestive of a cecal volvulus (Figures 2-3).

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**Figure 1.** Abdominal x-ray of dilated loops of bowel (arrows).

**Figure 2.** Axial CT scan of dilated cecum. Note air fluid level (arrow).
Considering the patient’s clinical picture of septic shock and an acute abdomen, surgical intervention was determined necessary, and an exploratory laparotomy was performed. Intra-operative findings included bowel ischemia from the terminal ileum to the junction of the descending and sigmoid colon (Figure 4). A subtotal colectomy was performed, and the abdomen was temporarily closed. The patient was sent to the intensive care unit (ICU) in critical condition. On the following day, the patient was brought back for an ileostomy. The distal portion of her terminal ileum was found to be ischemic, and the distal six inches of the ileum was removed. The patient received a Brooke’s ileostomy and was sent back to the ICU in stable condition. The patient's course in the hospital was uneventful, and she was discharged home fifteen days later.

**DISCUSSION**

Factors that cause volvulus may involve embryogenesis, age, ethnicity, diet, and prior abdominal conditions such as constipation. Sigmoid volvulus is more commonly found in elderly patients and those with low fiber diets and chronic constipation. Cecal volvulus is associated with an incomplete fixation of the cecum during embryogenesis. Normally during embryogenesis, the primitive gut tube lengthens and twists around the superior mesenteric artery 90 degrees counterclockwise outside the abdominal cavity. The primitive gut tube continues to twist around itself 180 degrees as it returns into the abdominal cavity. This results in the location of the appendix, cecum, ascending colon, and two-thirds of the transverse colon in the right lower portion of the abdominal cavity. Transverse volvulus is a rare event, because the anatomy does not easily permit twisting as compared to the cecum due to its shorter length.
Another important factor in understanding volvulus of the gut is the blood supply to the colon. Blood supply to the colon is significant because deficits can predict the pattern of colonic ischemia. The superior mesenteric artery supplies the cecum, ascending colon, and the first two-thirds of the transverse colon. The inferior mesenteric artery supplies the distal one-third of the transverse colon, descending colon, and sigmoid colon. There are two “watershed” areas in which there is relatively less arterial supply; these two areas are the splenic flexure and rectosigmoid junction. Colonic ischemia is more common in these areas, because there are fewer collateral blood supplies as compared to the rest of the gastrointestinal tract.

Diagnosing colonic volvulus is not always straightforward. Abdominal pain, distension, nausea, and/or vomiting are very common yet non-specific clinical symptoms of patients presenting with volvulus. If a volvulus becomes strangulated and subsequently perforates, the patient presents with a septic picture. This includes peritonitis on physical exam and hemodynamic instability. Some patients do have risk factors for volvulus such as age greater than 50, ethnicity, and previous abdominal surgeries.

To aid in diagnosis, abdominal x-rays and CT scans are the imaging modalities initially ordered. A contrast enema, sigmoidoscopy, or colonoscopy also can be used for evaluation and treatment of a suspected sigmoid volvulus. However, an exploratory laparotomy is always indicated for diagnosis as physical exam and imaging do not provide a definite diagnosis for volvulus.

Management of volvulus can be either medical or surgical. Volvulus in the sigmoid colon can be decompressed non-surgically by flexible sigmoidoscopy; however, this is only temporary as the recurrence rate is high. Surgical management includes detorsion with or without ce- coplexy, or resection of the ischemic or gangrenous bowel caused by the volvulus. Surgical resection is the most definitive method in treating volvulus because of its lower rates of recurrence compared to detorsion. 

Our case is unusual in the fact that we had a volvulus containing the terminal ileum, cecum, ascending colon, transverse colon, and descending colon down to the sigmoid junction. CT images were highly suggestive of a cecal volvulus but the extent of the volvulus was discovered during the operation. The only risk factor our patient had was age; she was over 50. Her presenting symptoms of GI bleeding, hypotension, and abdominal pain are related to her later diagnosis of a volvulus. Her symptoms of coffee ground emesis and melena were likely related to a lower GI bleed caused by the volvulus. The patient’s dehydration caused her hypotension, and the lack of perfusion probably caused her renal failure. This picture of hypotension and renal failure indicated that our patient was in septic shock, and an emergent exploratory laparotomy was needed for diagnosis and treatment.

It is unclear what the etiology of this volvulus was, but it was noted during surgery that the mesentery was loose and mobile. It is hypothesized that the mobile mesentery twisted on itself, disrupting the blood supply from the superior mesenteric artery, ileocolic artery, right colic artery, and middle colic artery, causing ischemia to the colon. Her presenting symptoms of GI bleeding, hypotension, abdominal pain and subsequent picture of septic shock were likely due to the volvulus itself rather than precipitating risk factors.
**LEARNING POINTS**

- Volvulus of one colonic segment is rare whereas volvulus involving more than one colonic segment is even rarer.

- Pre-operative assessment, including a physical exam and imaging, is often non-specific for volvulus; therefore, an intra-operative diagnosis of volvulus is more definitive in these cases.

- Regardless of the source of abdominal pain, a patient presenting with an acute abdomen should be taken immediately to the operating room for surgical exploration and intra-operative diagnosis.

**REFERENCES**


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