

Guess the Case

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INTRODUCTION

A 43-year-old male was admitted to the critical care service with sepsis and presumed pneumonia secondary to systemic inflammatory response syndrome criteria and pulmonary infiltrate on chest x-ray. The patient complained of 3 days of nausea and obstipation associated with abdominal distension and no passing of flatus. The patient denied vomiting. He had no aggravating or relieving factors. His medical history was significant for muscular dystrophy with chronic respiratory failure and ventilator dependence, although the patient was conversant. His surgical history was significant for tracheostomy and percutaneous endoscopic gastrostomy (PEG) tube placement. The patient lived in a long-term acute care facility. The remaining medical, surgical, family, and social histories and review of symptoms were noncontributory.

Physical examination showed that the patient was a thin male with a tracheostomy in no acute distress. His temperature was 98.1°F, heart rate was 60-80 beats per minute, and blood pressure was 80-100/40-50 mmHg. Respiratory and cardiovascular examinations were normal. The abdomen was distended, tympanic, and diffusely tender to palpation but was without percussion tenderness or guarding. Bowel sounds were absent, and the patient did not have any hernias. The PEG tube was in place without evidence of infection or leak.

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Peripheral pulses were 2+ in bilateral upper and lower extremities.

The patient's laboratory values were as follows:

- White blood cells: $25.4 \times 10^3/\mu\text{L}$, with 9% bands
- Hematocrit: 27.3%
- Platelets: $457 \times 10^3/\mu\text{L}$
- Total bilirubin: 1.5 mg/dL
- Amylase and lipase: within normal limits
- Aspartate aminotransferase/alanine aminotransferase ratio: within normal limits
- Uric acid: with trace ketones and no evidence of infection

QUESTION: What is the diagnosis and what treatment would you recommend?

DIAGNOSIS AND TREATMENT

The differential diagnosis included consideration of the following:

- Small bowel volvulus
 - Primary
 - Secondary: adhesions, Meckel diverticulum, internal hernia
- Small bowel obstruction
- Paralytic ileus

The kidney, ureters, and bladder x-ray (Figure 1) shows dilated small bowel loops in the right upper quadrant and no stomach bubble.

Computed tomography (CT) of the abdomen and pelvis (Figure 2) shows the PEG tube in a distended stomach and multiple loops of small bowel consistent with distal small bowel obstruction. The contrast goes to the distal jejunum. A transition point in the distal ileum shows bowel loops close together, which could represent adhesion or internal hernia. The colon is collapsed.

During exploratory surgery, a mid-gut volvulus was identified through a midline incision. The volvulus was reduced with counterclockwise rotation. The small bowel was inspected and found to be viable. The small bowel was fully evaluated, starting at the ligament of Treitz and continuing to the cecum. No bowel abnormalities were noted. The fascia was closed with a running 0 PDS suture (Ethicon, Som-



Figure 1. Plain flat abdominal x-ray.

ville, NJ), and the skin was approximated with skin staples. The patient did well postoperatively and regained normal bowel function. He was discharged on postoperative day 21 tolerating a regular diet after resolution of pneumonia.

DISCUSSION

Small bowel volvulus is an extremely rare but potentially life-threatening condition. It accounts for approximately 1.7% to 6.2% of all small bowel obstructions.¹ The overall mortality rate in Western countries is 10%-35%.² In the presence of small bowel gangrene, mortality is as high as 40%.²

Small bowel volvulus is categorized into primary and secondary causes. Primary small bowel volvulus occurs in a normal—not surgically altered—abdominal cavity. The cause is poorly understood because primary small bowel volvulus remains rare in North America and Europe. The incidence is higher in Africa and the Middle East where primary small bowel volvulus accounts for 31%-100% of all small bowel volvulus cases.¹ Researchers have speculated that abrupt changes in dietary habits, such as those common during fasting and feast seasons, may overload an empty bowel and cause forceful bowel peristalsis that results in small bowel volvulus.³

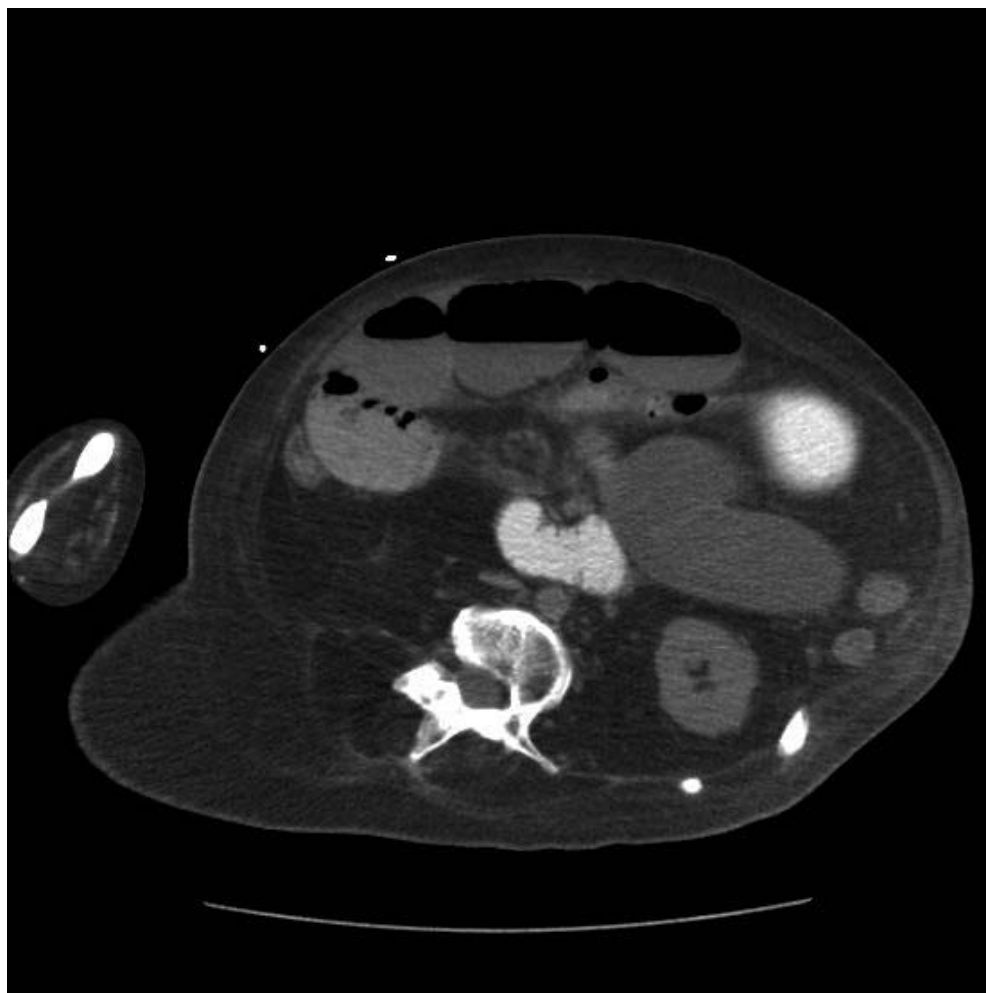


Figure 2. Contrast-enhanced computed tomography.

Secondary small bowel volvulus occurs as the result of an acquired lesion. It is normally seen in patients with tethering adhesive bands of scar tissue. This type of small bowel volvulus is more common in the Western world, accounting for 70%-90% of all small bowel volvulus cases.¹

The signs and symptoms of small bowel volvulus involve the classic features of intestinal obstruction. The universal symptom is central abdominal pain with severity out of proportion to the degree of obstruction. Abdominal pain not responding to narcotics is an ominous sign. Associated symptoms include nausea, vomiting, and abdominal distention. Twenty-five percent of patients present with peritonitis on admission.² However, preoperative peritonitis does not consistently identify the presence of an infarcted bowel. A review of 238 cases of small bowel obstruction from various causes showed that 90% of those with a necrotic bowel had a combination of fever, tachycardia, and peritonitis.¹ It is vitally important to detorse

the bowel before peritonitis or dead bowel occurs because either can easily lead to short bowel syndrome or too little bowel compatible with life. Therefore, one must consider small bowel volvulus in all cases of bowel obstruction. When the condition of patients with bowel obstruction is worsening, surgery must be considered rather than the radiological confirmation of volvulus.

The plain abdominal radiograph in small bowel volvulus shows nonspecific features of small bowel obstruction. Upper gastrointestinal series, angiography, CT, and magnetic resonance imaging may be helpful in making the diagnosis.⁴ CT is usually the most available study with the best chance of catching an abnormality. CT findings suggestive of small bowel volvulus include venous and lymphatic obstruction, arterial obstruction and infarction, closed-loop obstruction, abnormal location of intestinal loops, and the whirl sign that is seen with a twisting of the

mesenteric root.¹ In the case presented here, we suspected the diagnosis based on the x-ray findings.

Surgical treatment options available to treat small bowel volvulus include derotation (with or without fixation of the bowel to prevent recurrent volvulus) and resection with anastomosis to create adhesions to prevent recurrence. No long-term studies have evaluated these options and the risk of recurrent volvulus. Gangrenous bowel is always resected. Some authors recommend resection and anastomosis in all cases of small bowel volvulus regardless of evidence of gangrene.²

The outcome of small bowel volvulus depends on the time to diagnosis and thus surgical intervention. Because mortality rates are so much higher if the bowel is gangrenous, it is vitally important to identify this entity early and to operate as soon as possible. This condition is a surgical emergency, and accurate early diagnosis is key to improving outcomes. Mortality rates are likely high because this entity is difficult to identify early and symptoms, such as in this patient, do not seem extreme, so operation is delayed awaiting radiologic studies.

CONCLUSION

Small bowel volvulus is a potentially life-threatening cause of small bowel obstruction in the Western world. The key to reducing the mortality rate is a high index of suspicion to promptly institute surgical treatment. The diagnosis should move to the forefront of the clinician's mind for patients with small bowel obstruction and pain that does not respond to narcotic analgesics. CT is a quick and easy investigative tool that should be considered early because it may display diagnostic features of small bowel volvulus. Although no study has identified the best surgical treatment, some authors recommend resection and anastomosis in all cases.

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