An 83-year-old woman with Alzheimer dementia presented to the emergency department with abdominal distention. Her husband provided the history. After having constipation for 1 week, she developed a progressively distended abdomen in the course of 2 days, with anorexia but no vomiting, melena, or hematochezia. She had no history of fever, rigors, dyspnea, or weight loss. Her medical history was remarkable for hypertension, coronary artery disease, and impaired fasting blood glucose levels. Despite the recent symptoms, she had no history of gastroenterologic symptoms, cancer, abdominal surgeries, or colon screening studies. She lived with her husband in the community and was dependent on him for her activities of daily living except for ambulation with a walker and feeding herself. She was a nonsmoker and nondrinker. Her medications were 60 mg/d of isosorbide mononitrate, 325 mg/d of aspirin, 2.5 mg/d of amiodipine, 20 mg/d of atorvastatin, and a combination of 37.5 mg/d of triamterene and 25 mg/d of hydrochlorothiazide.

On examination, the patient appeared to be in mild distress with abdominal distention. Her vital signs were as follows: temperature, 36.6ºC; blood pressure, 154/89 mm Hg; regular pulse, 84 beats/min; respiration rate, 20 breaths/min; and oxygen saturation, 94% while breathing room air. The patient had normal levels of hemoglobin, white blood cells, platelets, chloride, bicarbonate, creatinine, blood urea nitrogen, troponin, and lipase, as well as a prothrombin time within the normal range. She had a serum sodium of 126 mEq/L (reference ranges provided parenthetically) (135-145 mEq/L), a potassium level of 2.5 mmol/L (3.6-4.8 mmol/L), and a blood glucose level of 198 mg/dL (70-100 mg/dL). Urinalysis was positive for trace occult blood and 1+ protein. Abdominal plain radiography showed prominent gaseous dilatation of the transverse colon and redundant sigmoid colon without distinct signs of obstruction or free air.

1. Which one of the following is the most likely cause of the abdominal distention in this patient?
   a. Acute diverticulitis with secondary ileus
   b. Ileus secondary to acute pyelonephritis
   c. Acute pancreatitis with associated ileus
   d. Obstructing colon cancer
   e. Pseudoobstruction of the colon secondary to electrolyte derangement and constipation

Diverticular disease is commonly encountered in older adults, who often present with abdominal pain of several days’ duration, low-grade fever, and mild leukocytosis. Patients often have symptoms of constipation, abdominal distention, nausea, and/or vomiting. Acute diverticulitis was an unlikely diagnosis in our patient who had no fever or leukocytosis.

Acute pyelonephritis usually presents with fever and pyuria and may be characterized by gastrointestinal symptoms, such as abdominal pain, anorexia, and/or ileus. Patients frequently describe flank pain as well as urinary frequency. The results of our patient’s urinalysis and the lack of urinary symptoms made acute pyelonephritis unlikely.

Patients with acute pancreatitis experience severe abdominal pain, nausea, and vomiting. With severe inflammation of the abdomen, acute pancreatitis might be associated with ileus. Biochemically, most patients have an elevated lipase and/or amylase level. Our patient did not report severe abdominal pain. Her lipase values were within normal range, making acute pancreatitis unlikely.

The risk of colon cancer increases with advanced age; thus, cancer is always a concern. Clinically, patients with colon cancer often have changes in bowel habits, hematochezia, abdominal pain, and/or iron deficiency anemia. Colon cancer obstruction usually follows a period of worsening symptoms of partial obstruction, such as abdominal distention, pain, and constipation. Our patient had no melena, hematochezia, anemia, or symptoms of progressive colon obstruction. Obstructing malignancy was an unlikely diagnosis.

Pseudoobstruction of the colon is defined as substantial colonic distention in the absence of an obstructing lesion. Patients usually present with abdominal distention and pain associated with constipation, nausea, and vomiting. Colon pseudoobstruction is often associated with other illnesses.

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Metabolic imbalance and especially hypokalemia are very common in patients with colon pseudoobstruction; however, in most cases other factors are also at work. Other common possible underlying etiologies for pseudoobstruction of the colon are severe infection, trauma, shock, and recent surgery. Our patient had severe hypokalemia associated with constipation and poor oral intake, which was thought to have caused colon pseudoobstruction.

The patient was hospitalized and hydrated with intravenous saline with potassium supplementation. Four days later, she had a potassium level of 4.5 mmol/L and a sodium level in the normal range. She received repeated enemas and rectal bisacodyl. These measures were unsuccessful, and her abdomen became more distended. Her repeated upright abdominal radiograph is shown in the Figure.

2. Which one of the following is the most likely diagnosis on the basis of the new radiologic findings and the poor response to previous management?

a. Toxic megacolon
b. Sigmoid volvulus
c. Diabetic gastroparesis
d. Severe constipation
e. Bowel perforation

Patients with toxic megacolon usually present with bloody diarrhea of several days’ duration, followed by fever, tachycardia, and hypotension. Toxic megacolon is a potentially fatal complication of inflammatory, infectious, or ischemic colitis that is characterized by severe segmental or total nonobstructive dilatation of the colon. On plain radiography, dilatation involves primarily the proximal and only rarely the sigmoid colon. Our patient had no signs of shock. Her radiograph revealed severe dilatation of the sigmoid colon. Given the clinical and radiologic findings, toxic megacolon was unlikely.

Sigmoid volvulus presents with severe abdominal distention and colon obstruction in older, debilitated adults. On plain radiography, the colon appears severely distended, and the dilated sigmoid forms an ahastral loop in the shape of an “omega sign.” Because of obstruction at the sigmoid level, radiography usually reveals gas paucity in the rectum. Our patient’s radiographic findings were consistent with sigmoid volvulus.

Gastroparesis is a chronic condition characterized by a delay in stomach emptying, which leads to periodic symptoms of nausea, vomiting, and abdominal discomfort, as well as marked gastric dilation on radiography. Because our patient’s radiograph did not show gastric dilation, gastroparesis was unlikely.

Severe chronic constipation might present with abdominal pain and distention. Fecal impaction can cause colonic obstruction. Rectal examination may reveal large amounts of stool. Abdominal radiography shows substantial accumulation of fecal material and might show colonic dilatation. No stool was revealed in the rectal examination of our patient. Her abdominal radiograph showed an extensive gaseous dilatation of the colon and “a bent inner-tube appearance” of the sigmoid, without any remarkable stool buildup. Severe constipation and fecal impaction were unlikely diagnoses.

Patients with bowel perforation often have severe abdominal pain, guarding, and potentially rebound tenderness. Radiography will often show free air in the upright or left lateral position. As our patient did not have such a clinical presentation and had no free air in the abdomen, bowel perforation was unlikely.

On the basis of findings on abdominal radiography, we concluded this was a sigmoid volvulus and initiated a management plan.

3. Given the patient’s diagnosis, which one of the following is the most appropriate next step in her management?

a. Conservative management with intravenous hydration, bowel rest, and watchful observation
b. Urgent surgical resection of the sigmoid colon
c. Laparoscopic resection of the sigmoid colon
d. Endoscopic reduction of the sigmoid volvulus
e. Intravenous antibiotics
In sigmoid volvulus, the blood supply to the involved gut is compromised. The bowel may become gangrenous, leading to perforation, peritonitis, and potentially fatal sepsis. Immediate detorsion is required with volvulus to restore the compromised blood perfusion.

Conservative management with rehydration and bowel rest will not release the volvulus and restore blood flow to the sigmoid and is therefore inappropriate. Surgical resection of sigmoid colon does not meet initial treatment goals of relieving the volvulus and restoring blood perfusion. For patients who have developed irreversible ischemic bowel injury, resection of the affected colon may become a life-saving procedure. The clinical and biochemical findings made bowel gangrene unlikely in our patient. Therefore, neither open surgical nor laparoscopic resection was indicated.

Endoscopic reduction of the volvulus relieves the obstruction and restores the blood supply to the affected sigmoid. Once sigmoid volvulus is suspected, endoscopic reduction should be performed immediately, before the volvulus bowel sustains irreversible ischemic injury. During endoscopy, the clinician can also visualize the colon and determine if the patient has developed bowel ischemia. Endoscopic reduction of the sigmoid volvulus was the most appropriate next step in the management of our patient.

Intravenous antibiotics are an important adjunctive treatment in patients with peritonitis. Because our patient had no signs of abdominal infection and the primary goal was to restore adequate blood flow to the bowel, antibiotic therapy was inappropriate.

Our patient underwent colonoscopy, which revealed an apparent volvulus at the rectosigmoid junction. By gently twisting and advancing the scope, we reduced the volvulus and passed the scope into a dilated sigmoid. Inspection of the colon revealed no other lesions or ischemia. A decompression tube was left in the colon.

5. Which one of the following is the most appropriate next step during this admission?

a. Arrange for a care conference with patient’s family and power of attorney immediately to discuss findings, prognosis, patient’s wishes, and plan of care
b. Because of advanced age, functional decline, and dementia, patient should receive hospice and comfort care only
c. Start broad-coverage intravenous antibiotics and fluid resuscitation; refer patient for emergency surgical resection of the necrotic bowel
d. Initiate intravenous antibiotics

No genetic factors are known to increase the risk of having sigmoid volvulus, and therefore children would not be at increased risk. Although a few cases of combined volvulus and cancer of the sigmoid have been reported, no clear causal relationship exists between the 2 entities. No association is known between sigmoid volvulus and mitral regurgitation.

Recurrence of sigmoid volvulus is very common. After endoscopic reduction alone, the recurrence rate can be more than 50%. Risk factors that predict recurrence have not been established. After performing the endoscopic reduction and decompressing the obstructed colon, a surgical correction of the underlying anatomy is needed to prevent volvulus recurrence. One randomized trial suggests performing Hartmann operation (resection of the sigmoid with closing of the rectal stump and colostomy) for patients who develop gangrenous sigmoid. If the reduced bowel is not ischemic, the sigmoid colon could be resected with primary anastomosis. Mesosigmoidopexy (surgical repair and fixation of the mesentery of the sigmoid flexure) is less successful than resection of the sigmoid colon. In selected patients, qualified surgeons can perform sigmoid resection laparoscopically.

The hospital team discussed the findings of the colonoscopy with the patient’s family. The physician explained the likelihood of recurrence and the different procedures that may prevent future volvulus. Because of the patient’s impaired cognitive and functional status, her husband requested conservative management. He elected not to proceed with any further operative procedure. The patient recovered gradually, and the colonic decompression tube was removed. She was discharged to her home.

Three months later the patient was seen in the emergency department with a presentation similar to that of her previous admission. Emergency colonoscopy was performed. Unfortunately, it revealed recurrent sigmoid volvulus with necrotic bowel.
The clinician should explain clinical findings, diagnosis, and prognosis to the patient and family (when permitted by a competent patient) in all situations. This principle particularly applies when one faces a serious or life-threatening situation. All reasonable approaches and their potential risks and benefits should be discussed with the patient and family. The health care professional should help the family, with the patient’s input, choose the approach that best meets the patient’s wishes (shared decision making). In our case, the family made decisions given the cognitive status of the patient. Arranging for a care conference with the patient’s family would be the most appropriate next step.

Although the patient had a poor prognosis and a high risk of perioperative complications because of her advanced age and poor functional status, comfort care alone would have been inappropriate without discussing the findings and the different management options with her family. If the family is available, proceeding to surgery and intravenous antibiotics would be inappropriate without conducting the appropriate discussion and making shared decisions.

Antibiotic treatment without fluid resuscitation and surgical removal of the gangrenous bowel is futile and therefore inappropriate. Proceeding to laparoscopic sigmoidectomy would also be inappropriate without the consent of the family.

After discussing the findings and prognosis, the family requested comfort care only. The patient entered hospice care and died within 24 hours.

**DISCUSSION**

Sigmoid volvulus is a common and potentially life-threatening condition occurring in older, frail adults. A volvulus of the colon occurs in the sigmoid region about 40% of the time. Patients usually have symptoms of continuous abdominal pain, distention, nausea, and constipation. Often vomiting does not occur or occurs infrequently. These symptoms often seem nonspecific and are even less specific in patients unable to verbalize symptoms. On plain radiography, “bent inner-tube appearance” (severely distended sigmoid loop) is the classic finding. Some authors describe the dilated twisted sigmoid loop as an “inverted U” or “omega sign.” Clinicians often observe a lack of gas in the rectum distal to the obstruction and dilated descending colon. Typical computed tomographic findings include a “bird-beak appearance” and a “whirl pattern” of the dilated twisted sigmoid.

The appropriate management should relieve the volvulus, reestablish the blood perfusion to the affected colon, and prevent possible future recurrence. The presence of gangrenous bowel is a major predictor of mortality. Endoscopic reduction of sigmoid volvulus alone is associated with a significant risk of recurrence; hence, sigmoid resection with coloproctostomy or end colostomy should follow endoscopic decompression. Laparoscopic sigmoidectomy minimizes surgical complications and shortens recovery time. It provides a promising alternative for elderly patients with chronic illness.

**REFERENCES**


Correct answers: 1. e, 2. b, 3. d, 4. e, 5. a