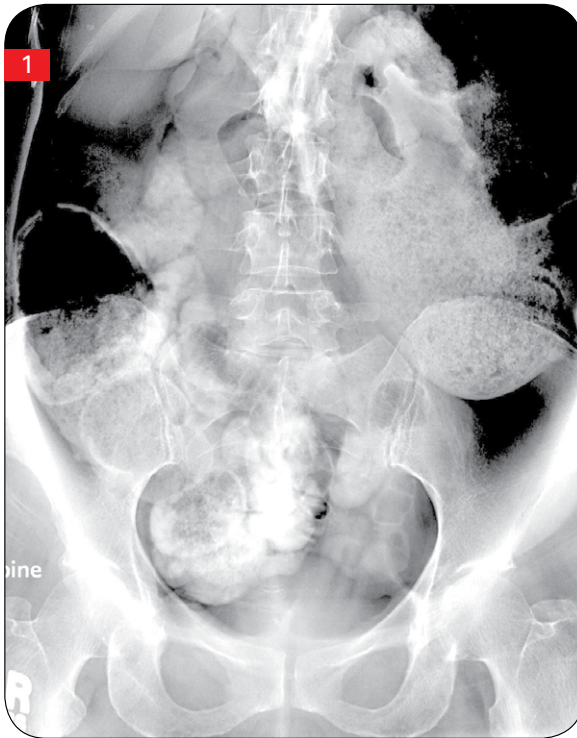


PROBLEM

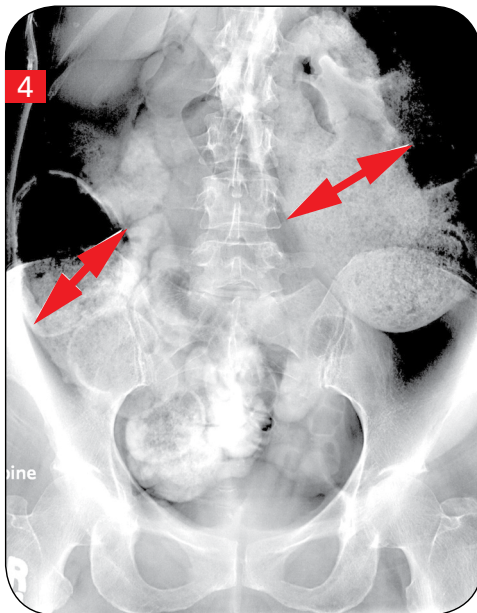
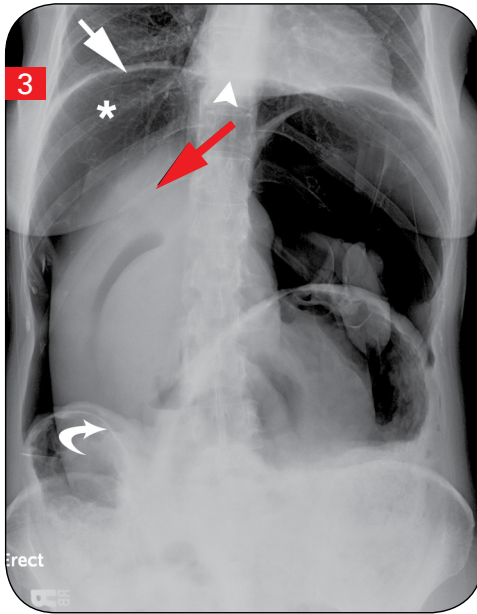


>> A 67-year-old woman presents to the ED with sudden onset of severe abdominal pain. Supine (Figure 1) and upright (Figure 2) abdominal radiographs are obtained.

What is your diagnosis?

Turn page for answer >>

ANSWER

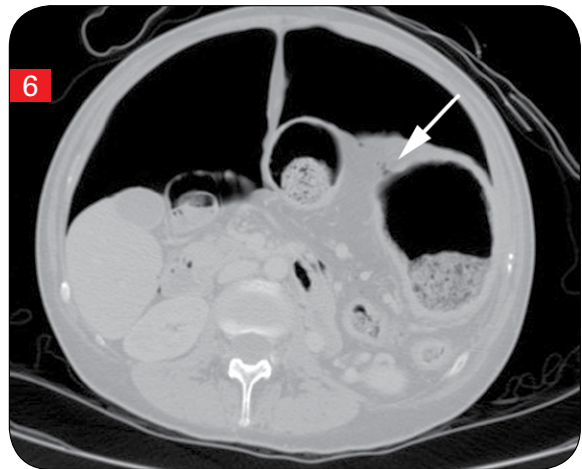
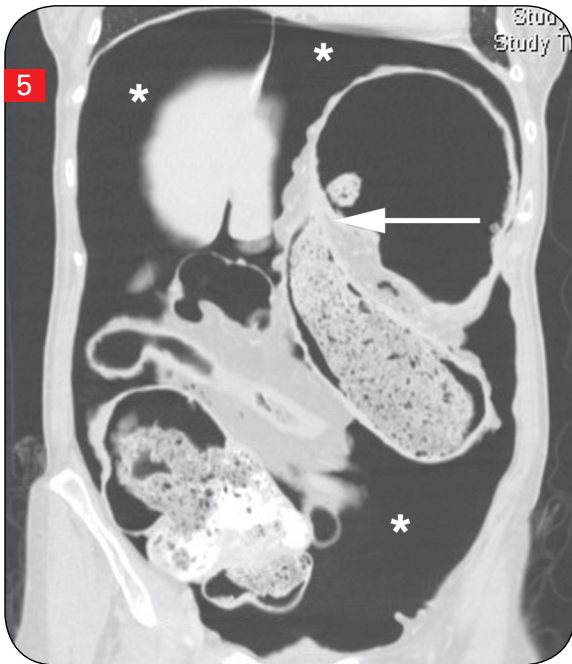


>>The abdominal radiographs reveal a large amount of free air, or *pneumoperitoneum*, within the abdomen. Several radiographic signs of this phenomenon are present. In the healthy patient, there is an absence of space between the right hemidiaphragm and the liver. However, when there is free air in the abdomen and the patient is upright (Figure 3), the air (white asterisk) collects between the right hemidiaphragm (white arrow) and the liver (red arrow). A second sign of free air seen on this patient's upright radiograph is the *continuous diaphragm sign*, in which the left and right hemidiaphragms appear to be a continuous structure (white arrowhead). Yet another sign is the visualization of air on both sides of a single loop of bowel (curved white arrow); this is caused by the contrast of the bowel wall with the air in the lumen on the inside and free air on the outside, and is known as the *Rigler sign*.¹

While the radiographs do not show the cause of the bowel perforation, the presence of dilated loops of large bowel, measuring up to 9 cm (red arrows, Figure 4), suggests the possibility of a large bowel obstruction. As a rule of thumb, a normal colon measures less than 6 cm in diameter. Pneumoperitoneum in a patient with abdominal pain is in itself an indication for surgery; however, since this patient was hemodynamically stable, CT was performed to identify the source of perforation.

A coronal CT image (Figure 5) demonstrates the free air (white

ANSWER



asterisks) and the reason for the large bowel obstruction. There is twisting of the sigmoid colon on its mesentery (white arrow), which is diagnostic of a sigmoid volvulus. This can be confirmed by reviewing the adjacent CT slices and following the bowel. An axial CT image (Figure 6) demonstrates the site of the perforation (white arrow).

The sigmoid colon is the most common site of volvulus, and sigmoid volvulus is the third most common cause of colonic obstruction after neoplasm and diverticulitis.² Presenting symptoms frequently include abdominal distention, abdominal pain, constipation, and vomiting. If the volvulus

progresses to a perforation, fever and shock may ensue; death is possible as well. For this reason, early detection of intestinal perforation, radiographically indicated by pneumoperitoneum, usually mandates emergent surgery.³

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