

# RADIOLOGY ROUNDS

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Department Editor

## A woman with abdominal pain, nausea and vomiting, and weight loss

James D. Collins, MD

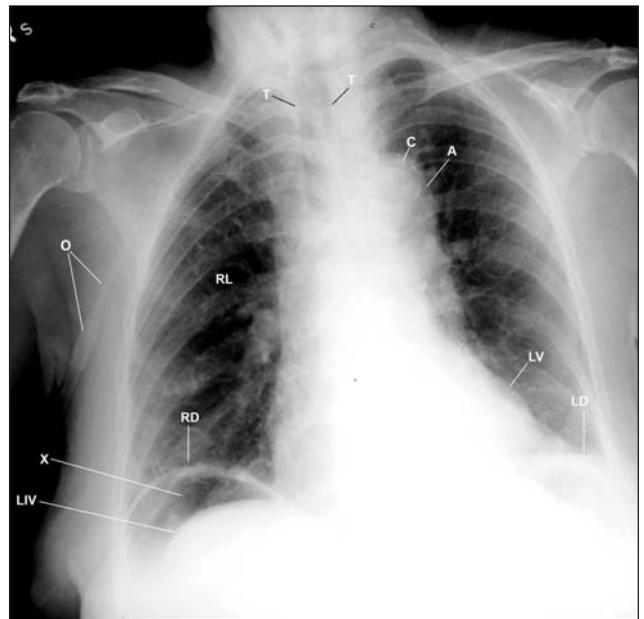
This 76-year-old woman was admitted for an elective workup of panniculitis that had been diagnosed by biopsy during an exploratory laparotomy at another hospital. This had been preceded by diarrhea of soft brown stools, 6-7 times a day. Now, 2 months after the laparotomy, she has rectal incontinence, loss of appetite, and a weight loss of 35 lb. She reports a 3-day history of abdominal pain, nausea and vomiting, and increasing abdominal girth, but no melena or hematochezia.

Findings of the physical examination include a temperature of 39°C; blood pressure, 120/80 mm Hg; pulse, 140 and irregular; and a massively distended abdomen with mild peritoneal signs and evidence of ascites. The creatinine level was 3.8 mg/dL, and blood urea nitrogen, 14 mg/dL.

A posteroanterior (PA) chest radiograph displayed air under the diaphragm (Figure 1). An anteroposterior (AP) scout radiograph of the abdomen displayed a large amount of free peritoneal air, extensive vascular calcifications, and degenerative changes of the osseous structures (Figure 2, page 19). A right decubitus radiograph of the abdomen that displayed free air (Figure 3, page 19) was followed by a fluoroscopic spot radiograph with a diluted Gastrografin enema (Figure 4, page 20). Among the findings were the rectum within normal limits; the sigmoid colon in spasm with several diverticula; and perforation at the junction of the sigmoid and descending colon, with contrast material flowing freely in the peritoneal cavity.

### The surgical-pathological correlation

The patient was prepared for surgery, and a half liter of purulent, feculent material was drained from the peritoneal cavity. Necrosis and indurations of the entire sigmoid colon were found that involved the as-



**Figure 1** This posteroanterior upright chest radiograph, in which the patient is leaning right, displays free air (X) below the right hemidiaphragm (RD), an elevated left hemidiaphragm (LD), and atheromatous calcifications (C) within the arch of the aorta (A). LIV = liver; left ventricle (LV), O = oxygen line; RL = right lung; T = trachea.

ending colon to the splenic flexure. A perforation the size of a silver dollar in the mid-sigmoid was repaired with Hartmann's procedure. Analysis of the specimen revealed chronic diverticulosis and diverticulitis; ischemic bowel disease; atherosclerosis of the mesenteric vessels; no evidence of granulomatous bowel disease; and perforation in the sigmoid colon secondary to arteriosclerotic vascular disease.

### Discussion

Diverticulosis has been estimated to occur in 5% of the general population, affecting men and women equally. Its incidence increases with age, with about 65% of those older than 85 having diverticula.<sup>1</sup>

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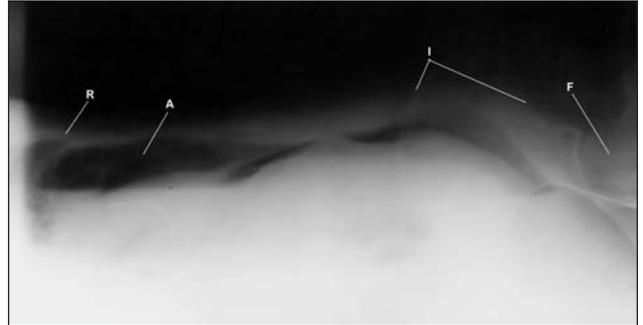
**Figure 2** This anteroposterior upright radiograph of the abdomen displays free air within the right upper quadrant between the liver and the anterior abdominal wall (small arrows) and over the right ala of the ilium (I). Observe the hazy density of ascites obscuring details of landmark anatomy within the abdomen, particularly the atheromatous calcification of the mesenteric vessels (AT). I = iliac crest; NG = nasogastric tube with its tip over the stomach (S); 5L = fifth lumbar vertebra; 12T = twelfth thoracic vertebra.

Diverticulitis occurs with increasing frequency in those whose diverticulosis is prolonged, with rates of 10% after 5 years; 25% after 6-10 years; and 37% after 11-18 years.<sup>1</sup>

Perforation of a diverticulum of the colon is a serious—but rare—complication. It can be staged according to the Hinchey classification system: Stage I—small confined pericolic abscesses; stage II—distant (pelvic, retroperitoneal) abscess; stage III—purulent peritonitis after rupture of a pericolic or pelvic abscess; stage IV—fecal peritonitis after perforation of the colon.

The clinical picture is one of vague colicky pain in the lower abdomen, followed by severe constant pain of peritonitis. There may be a history of a purgative or an enema. Vomiting, pyrexia, and tachycardia are almost always present, and there may be some abdominal distention and obstipation, hypotension, and signs of septic shock.

The differential diagnosis should include appendicitis, perforated carcinoma of the colon, mesenteric vascular insufficiency, and strangulating obstruction.



**Figure 3** This right lateral decubitus radiograph of the abdomen displays free air (A) marginating the upper inner margins of the peritoneal cavity. The hazy appearance of ascites obscures definition of air fluid levels within the abdomen; F = femur; I = iliac ala; R = rib.

### Diagnostic studies

Laboratory studies will indicate infection with polymorphonuclear leukocytosis, and blood chemistry results should reflect the degree of fluid loss to the outside and into the peritoneum and gut.

Radiographic examination should include a supine and upright radiograph of the abdomen and upright PA chest (a three-way abdomen). Before these are done, the patient should sit upright to allow free air to migrate beneath the diaphragm. A lateral decubitus abdominal radiograph may display free air if the patient cannot sit up. The radiologist should be warned of the possible diagnosis of perforation because a barium enema can be dangerous and even fatal if it causes barium peritonitis. As in this case, aqueous Gastrografin should be used if perforation is suspected. CT scanning is recommended when available.

Hartmann's procedure with segmental colectomy is generally considered the preferred treatment of free perforation. Treatment should at least consist of a diverting colostomy with drainage of the peritoneal cavity.<sup>4</sup> Some groups are advocating primary resection for patients with peritonitis complicating diverticular disease of the colon.<sup>5</sup>

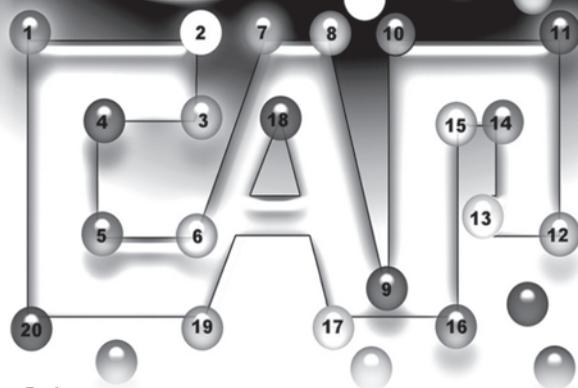
### Take home message

In a patient older than 40 with vague colicky pain in the lower abdomen, followed by severe constant pain, perforation of the bowel should be considered. This serious complication may be especially likely if a patient has had an exploratory laparotomy and biopsy. An emergency visit is essential. The radiographic workup

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## Program Learning Objectives

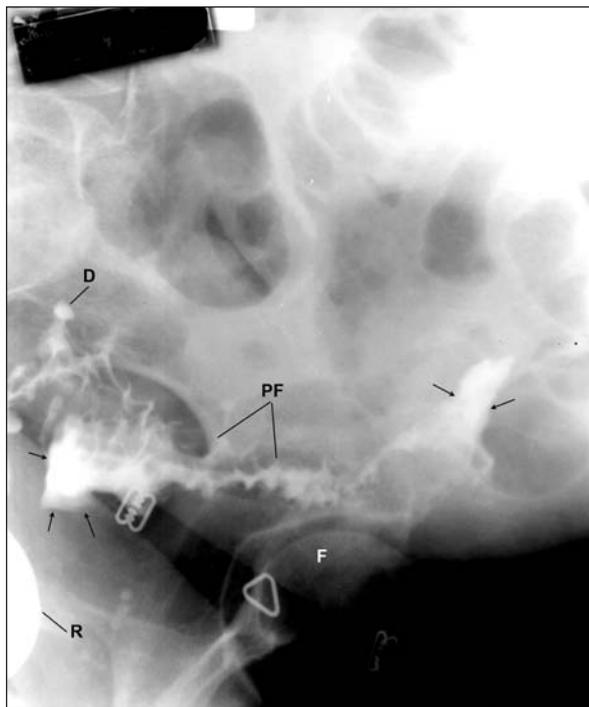
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**Figure 4** This left posterior oblique fluoroscopic spot radiograph was obtained after an Gastrografin enema. It demonstrates extravasation of contrast material from the perforation of the large bowel at the junction of the sigmoid and descending colon (2 black arrows). Observe the contrast within the intact distal sigmoid colon (3 black arrows), diverticula (D), and the “picket fence” (PF) appearance of the edematous folds within the colon (diverticulitis). F = femur; R = rectum.

includes upright AP chest and abdomen and lateral decubitus abdomen radiographs (three-way abdomen series). The radiologist must be made aware of a possible perforation to avoid using barium that could cause barium peritonitis. ■

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