An 83-year-old white woman with a 1-month history of worsening midback pain was seen because of a sudden exacerbation of pain and the development of right neck and arm cyanosis. Her medical history was pertinent for a cerebral vascular accident, myocardial infarctions, congestive heart failure, hypertension, and adult-onset diabetes mellitus. At physical examination the patient was found to be an alert but agitated elderly woman in mild distress. The reported cyanosis had resolved. The pulse and blood pressure were equal in all extremities. The heart tones were distant. There was a soft 1/6 systolic ejection murmur and a soft pericardial rub, but there were no discernible gallops. Evaluation for possible aortic dissection was initiated with chest radiography (Fig 1).

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Diagnosis: Pyopneumopericardium

Computed tomography of the chest (Fig 2 and 3) showed pericardial gas and loculated fluid, with gas also present in the wall of the ascending aorta. In retrospect, gas could be seen overlying the heart on the chest radiograph.

The patient refused surgical intervention or further diagnostic workup and was admitted to a medicine service for pain and blood pressure control. Following admission she became febrile with progressive leukocytosis. Broad-spectrum antibiotic therapy was initiated for presumptive urosepsis and pericarditis. Cultures of blood drawn on admission were reported as positive for Clostridium perfringens on the second hospital day. A septic syndrome with progressive hypoxemia and hypotension developed, and the patient died on the fourth hospital day.

Autopsy showed a large aneurysm in the ascending aorta with retrograde dissection and bacterial infection. There was evidence of chronic pericarditis. The pericardial cavity was filled with organizing thrombus and abscess. Gram-positive bacteria, consistent on staining with Clostridium species, were found. Colonic diverticulosis was incidentally noted.

Pneumopericardium and pyopneumopericardium are both rare. In most patients, pyopneumopericardium results from trauma or iatrogenic intervention. Approximately 25 percent of cases are secondary to disease in contiguous organs.1 Pneumopericardium may occur spontaneously.2 The pathophysiologic mechanism is probably a rise in intra-alveolar pressure above atmospheric, resulting in rupture of alveoli and air dissection to the hilum and mediastinum and through the pericardial reflection on the pulmonary vessels into the pericardial cavity.3 Case reports have shown that this type of spontaneous pneumopericardium may complicate acute asthma, prolonged labor, barotrauma from positive-pressure ventilation, and cocaine inhalation by special positive-pressure sniffing techniques.4 Small amounts of pericardial gas may remain asymptomatic if a tension pneumopericardium does not develop.4

Our patient presented with infection at the site of an old aortic dissection, resulting in pyopneumopericardium detected by computed tomography. Pyopneumopericardium is rarer than simple pneumopericardium and is associated with a mortality rate of nearly 100 percent. Pyopneumopericardium not resulting from trauma or iatrogenic intervention is most often associated with perforated ulcerations of the stomach and/or esophagus into the pericardium. Conditions that predispose to the development of such ulcerations are Barrett’s esophagus, hiatal hernia, and achalasia. Carcinomas and lymphomas of the stomach, esophagus, and bronchi have also been reported to erode into the pericardium. Other causes include fistulous tracts into the pericardium from tuberculosis mediastinal lymphadenitis, amebic hepatic abscess, and invasive pulmonary aspergillosis.3,5-11 There have been 12 reported cases due to spontaneous gas production from infected pericardial fluid.1,9 To our knowledge, pyopneumopericardium resulting from C perfringens septicemia has never been reported.

Clostridium septicemia can be a highly lethal infection. Prior to the legalization of abortion it was a common sequela to illicit abortion attempts.10,13 Nontraumatic Clostridium septicemia is now most often associated with disease or malignancy of the uterus, colon, or biliary tract.12,13 Dissemination of organisms into the blood is favored by ulcerative, necrotic, or infiltrative processes of the mucosa, where these organisms normally reside.12 Visceral perforation, acute pancreatitis, and diverticulitis are other predisposing conditions. Occasionally, immunocompromised patients with overwhelming septicemia may develop

Figure 2

Figure 3
metastatic gas collections. Although the cause of Clostridium septicemia in our patient was not clear, the prosector considered the colon to be the likely source, given extensive diverticulosis.

In summary, the presence of pneumopericardium should prompt investigation to rule out a fistulous connection between the pericardium and contiguous gas-containing organs. Clostridium infection is another potential cause of pneumopericardium that may be associated with pericardial abscess. Physicians should consider Clostridium sepsis in any patient with pyopneumopericardium who has recently undergone an abortion or who has an advanced malignancy and develops abdominal pain and fever.

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