Incidental Demonstration of Pericardial Fistula During Hepatobiliary Scintigraphy

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Biliary vomiting developed 16 mo after resection of adenocarcinoma of the esophagus in a patient with a complex postoperative course. A biliary scan revealed an outline of the pericardium, suggesting a fistula. The potential role of radionuclide imaging in this rare and potentially fatal complication is discussed.

Fistulous connection to the pericardium is a rare and frequently fatal complication of benign and malignant processes involving adjacent structures. Esophago-pericardial fistulas are the most common (1), but pericardial fistulas from the stomach (2), duodenum (3), colon (4,5), liver (6), jejunum (7), pleura, and cutaneous tissues (8) have been reported. We present an incidental finding of a pericardial fistula during routine hepatobiliary imaging.

**CASE REPORT**

A 48-yr-old male was admitted for nausea, bilious vomiting, and abdominal pain. He had been diagnosed with adenocarcinoma of the distal esophagus 16 mo prior to this admission and had undergone resection. Postoperatively, he continued to have intermittent anorexia and dysphagia, requiring dilation of strictures and, eventually, placement of an endoprosthetic stent in the distal esophagus 6 wk prior to this presentation.

Physical exam on admission was remarkable for ascites which paracentesis proved to be malignant. Computed tomography scan showed changes consistent with the previous surgery but there was additional soft-tissue density surrounding the distal stent suggestive of tumor recurrence. The liver, gallbladder, and pancreas were noted to be normal. A supine film of the abdomen demonstrated a gasless abdomen. A limited upper gastrointestinal series was performed to look for obstruction. The stent was patent, the stomach taut and poorly distensible, but barium did eventually enter the duodenum.

There was intermittent reflux of barium from the duodenum back into the stomach and esophagus (Fig. 1A-C).

A hepatobiliary scan was performed with 4 mCi technetium-99m-DISIDA to evaluate a possible afferent loop syndrome and patency of the small bowel distally. During the course of the exam, which had been normal up to that point, the patient acutely complained of shortness of breath, chest discomfort, and left arm numbness. The patient was tachycardic (heart rate 128/min) and tachypneic (respiratory rate 24/min) with warm, clammy skin, weak but regular pulse, and distant heart sounds. No neck vein distension or pericardial friction rub was appreciated. Electrocardiogram showed low voltage but no other acute changes. The patient then became hypotensive, requiring intravenous fluid and pressor administration. The question of pulmonary embolism, in addition to pericarditis was raised. A portable echocardiogram suggested a complex pericardial collection. A ventilation/perfusion scan was requested, but prior to performing this, an additional gamma camera image of the abdomen was obtained (6 hr postinjection). Activity was demonstrated within jejunal loops, confirming a slow intestinal transit of the tracer. In addition, a curvilinear accumulation of the radiotracer was seen outlining the heart (Fig. 2A-B).

Emergent pericardiacentesis was performed and a drainage catheter was left in place. Several hundred milliliters of bilestained purulent fluid was obtained which grew out *Escherichia coli* and alpha- and gamma-hemolytic streptococci. Markedly elevated total bilirubin, amylase, and lipase levels were detected in the pericardial effluent, with normal serum levels. No malignant cells were detected on cytologic exam. Nonionic contrast was instilled through the pericardial catheter but no fistulous tract or leakage could be demonstrated (Fig. 3). Due to the patient’s poor prognosis, no further interventional or diagnostic procedures were performed. The patient survived an additional nine days after detection of the fistula on supportive care. No autopsy was performed.

**DISCUSSION**

The detection of a pericardial effusion with radiotracers is well documented. Photopenic “halos” around the heart after administration of blood-pool agents were commonly used to demonstrate pericardial effusions before the advent of echocardiography (9). Similar findings are seen during the equilibrium blood-pool phase using other radionuclides.

The possible mechanisms of entry of radiotracers into the pericardial space are diffusion of activity from...
the bloodstream or from damaged myocardial or serosal tissues, or through direct communication with a biliary structure or with bile containing hollow organs or cavities.

Direct or fistulous communication to the pericardium from adjacent structures is uncommon, with the esophagus as the source in the majority of cases (1). Although esophagopericardial fistulae are most frequently a complication of benign disease (10), the outcome is generally poor. Formerly universally fatal, a recent series of cases and review of the literature suggests that surgery has led to survival in 20% of recent cases (11). Also, acute survival has been described in four patients with non-surgical intervention, one undergoing immediate decompression of the tense pneumopericardium by percutaneous drainage and antibiotic therapy (12–15).

In our patient, fistula to the pericardium is the most likely diagnosis. In spite of the demonstration of bile and bacteria in the pericardial effluent, a biliary-pericardial fistula is unlikely in view of the normal CT scan and the normal appearance of the liver and bile ducts on the hepatobiliary scan. Just as the upper gastrointestinal series had demonstrated reflux from the duodenum into the stomach and esophagus, the hepatobiliary agent also refluxed into the gastroesophageal region. Therefore, we postulate a fistulous communication in the region of the esophagogastric anastomosis, presumably related to local tumor recurrence and necrosis. The sudden onset of symptoms during hepatobiliary imaging suggests that the communication was established just prior to or during the study. The serendipitous documentation of the pericardial collection drastically changed the course of the patient’s diagnostic work-up and treatment, but unfortunately, not the outcome.

In patients at high risk for such a complication [a history of local cancer or peptic ulcer disease, or status following an endoscopic procedure such as foreign-body retrieval (10)], the use of delayed imaging of an hepatobiliary agent or peroral tracer to evaluate for gastrointestinal/pericardial fistula could be of value.

REFERENCES

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