IDENTIFICATION OF AN INFECTED PSEUDOCYST OF THE PANCREAS WITH ^{67}Ga-CITRATE: CASE REPORT

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A case in which the preoperative diagnosis of an infected pseudocyst of the pancreas was made by ^{67}Ga-citrate scanning is reported. Other approaches to the diagnosis of pancreatic pseudocysts are reviewed.

This communication reports a case in which ^{67}Ga-citrate scanning was helpful in establishing the preoperative diagnosis of an infected pseudocyst of the pancreas. Since 1970, when ^{67}Ga-citrate was introduced by the Oak Ridge Associated Universities as a scanning agent for patients with various malignancies (*1*), several reports have attested to its accuracy in diagnosing both neoplastic and inflammatory disease, including abscesses. Despite the current widespread use of this agent, no reports of its use in cases of pancreatic pseudocyst could be found.

CASE REPORT

The patient was a 70-year-old white woman who had a sudden onset of epigastric pain with nausea and vomiting. Approximately 1 week after the attack she underwent cholecystectomy for cholelithiasis. Multiple small stones were found. The serum amylase was elevated to greater than 4,000 Somogyi units for the week prior to surgery but fell to approximately 250 Somogyi units the day before surgery. The cholecystectomy was performed without apparent complications, but postoperatively she complained daily of nausea, vomiting, and abdominal pain. The serum amylase was persistently elevated. She denied any history of alcohol abuse or other significant underlying medical problems. She was transferred to Kansas University Medical Center for further evaluation.

The positive physical findings were limited to the abdomen, which was rigid; it showed diffuse tenderness, guarding, and some rebound tenderness. A pulsatile mass, 3 × 3 cm, was palpated in the midabdomen. The initial impression was postoperative pancreatitis and an abdominal aortic aneurysm. An abdominal sonogram revealed a cystic mass in the head of the pancreas. An upper gastrointestinal series revealed no evidence of a pancreatic process. Selective arteriography was not performed.

Because of persistent fever and elevated serum amylase, a gallium scan was obtained to rule out a pancreatic abscess. The anterior scan (Fig. 1) demonstrated an area of increased activity, 8 × 8 cm, in a ring-like configuration in the midabdomen. The concentrating area was located anteriorly on the lateral projection (Fig. 2). The diagnosis of an infected pancreatic pseudocyst was made.

At operation the patient was found to have an 8-cm retrogastric pseudocyst of the pancreas; the mass extended to the duodenum and put extrinsic pressure on its second portion. Examination of the small bowel, colon, kidneys, stomach, and esopha-

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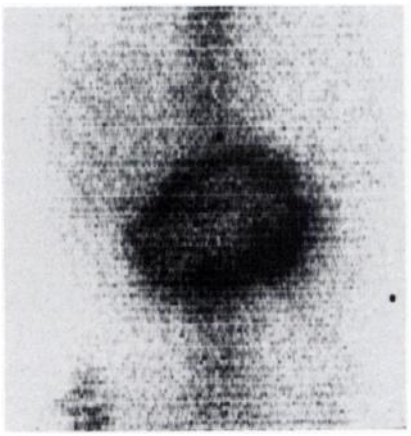

FIG. 1. Anterior abdominal scan shows ring, 8 cm in diam, of increased ^{67}Ga uptake in midabdomen.

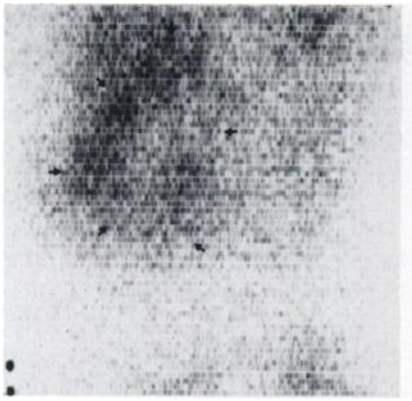

FIG. 2. Left lateral scan also shows ring of increased ^{67}Ga activity.

geal hiatus was unremarkable. The wall of the pseudocyst was thick and fibrotic. A cystogastrostomy was performed following lysis of all loculations and adhesions. The patient tolerated the operative procedure well and no complications were encountered. The biopsy specimen showed subacutely inflamed necrotic tissue in the wall of the pseudocyst, and enterococci were cultured from the surgical specimen.

DISCUSSION

Pseudocysts of the pancreas are fluid-filled structures without an identifiable epithelial lining, located either within the pancreas itself or in close relationship to it. They develop as complications of other conditions, particularly alcoholic pancreatitis, trauma to the pancreas, or pancreatic carcinoma. The exact etiology is difficult to determine at surgery or autopsy since enzymatic digestion of adjacent tissues destroys normal anatomic relationships. Nevertheless, pseudocysts often appear to be related to either ductal obstruction or disruption of ductal continuity (*2*). True pancreatic cysts tend to be multilocular and an epithelial lining can usually be demonstrated histologically.

A variety of radiographic methods have been employed in the diagnostic study of suspected pseudocysts of the pancreas (*2–4*). Elevation of the left hemidiaphragm and a left pleural effusion may appear on chest x-ray. On supine, upright, and lateral films of the abdomen, one may see pancreatic calcifications, soft-tissue masses, and a retroperitoneal effusion obscuring the outline of the left kidney and psoas muscle. Sonography reveals pseudocysts to be generally round-to-oval transonic masses (*5*). A barium enema may show a soft-tissue mass displacing either the transverse colon or the splenic flexure inferiorly. In addition, the "colon cutoff sign" may be seen (*3*). This consists of the abrupt termination of the column of gas within the lumen of the colon and is due to irritability caused by an extension of the pancreatic inflammatory process through the transverse mesocolon or phrenicocolic ligament. The upper gastrointestinal study may show a wide variety of nonspecific changes, including displacement of the stomach, widening of the duodenal loop, and mass effects on the lesser curvature. Intravenous cholangiography typically shows no evidence of stones and may faintly visualize the gallbladder. The most striking change is the displacement of the common duct to the right as it is draped over the pseudocyst. Transduodenal pancreatography may show blunting of the secondary pancreatic ducts as well as multiple areas of stenosis within the major pancreatic ducts, but more importantly, the pseudocyst itself will often be filled with contrast material, thereby establishing the diagnosis (*2*). Selective arteriography may show stretching or displacement of some of the branches of the celiac axis, left hepatic artery, gastroduodenal artery, or superior pancreatoduodenal arteries.

Imaging of the pancreas by the use of radionuclides is a well-recognized noninvasive method for studying the pancreas. Selenium-75-selenomethionine is the only radiopharmaceutical widely used in scanning of the pancreas. Although scanning with this agent may prove helpful in selected patients with pancreatic disease, especially pancreatic carcinoma and chronic pancreatitis, its long biologic half-life, necessarily low information density, and interference from ^{75}Se uptake in the liver make it far from ideal as a pancreatic imaging agent.

In the past several years ^{67}Ga-citrate has had widespread utilization in the detection of malignancy. During the course of these studies, it has become apparent that some areas of intense gallium uptake are actually due to ^{67}Ga deposition in inflammatory lesions, most notably abscesses (*6,7*). Gallium is thought to localize in areas of abscess and inflammation because it is concentrated in vivo by white cells. The labeling mechanism is believed to be the in vivo uptake of ^{67}Ga in lysosome-like granules within circulating granulocytes. Although granulocyte uptake of ^{67}Ga has been shown in vivo and in vitro in normal cells (*8*) and leukemia (GL) cells (*9*), some investigators believe that the detection of abscesses with ^{67}Ga is due not to specific gallium uptake in granulocytes, but rather to the uptake of such gallium–protein complexes as gallium–haptoglobin and gallium–transferrin (*10*), or gallium–albumin in the infected tissues.

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