PANCREATIC ABSCESS ASSOCIATED WITH PANCREAS DIVISUM

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Pancreas divisum has been implicated as a cause of pancreatitis. Pseudocyst development in association with chronic pancreatitis has also been observed in a few patients with this anomaly. The association of pancreatic abscess with pancreas divisum has not been observed previously. The case herein reported illustrates a coincidental finding of pancreas divisum in a patient who presented with a pancreatic abscess.

At approximately the eighth week of embryologic development, the ventral and dorsal pancreatic buds fuse into a single organ.[1] With normal development the duct system of the dorsal pancreatic bud, which drains most of the superior anterior segment of the head, body, and tail of the gland through the minor papilla, fuses with the duct system of the ventral pancreatic bud, which drains the posterior inferior portion of the head of the gland and joins the common bile duct at the major papilla.[2] The result of this fusion is the formation of the major pancreatic duct of Wirsung. After fusion of the duct systems of the dorsal and ventral pancreatic buds, the duct of Santorini, which flows through the minor papilla, regresses and, in most instances, becomes completely obliterated.

Pancreas divisum is a congenital anomaly of the pancreas that develops when the duct systems of the ventral and dorsal pancreatic buds fail to fuse. As a result, most of the body of the pancreas is drained by Santorini's duct through the minor papilla, whereas the isolated ventral pancreas is drained by a shortened Wirsung's duct, which flows together with the common bile duct through the major papilla.

The incidence of pancreas divisum is unknown. Studies involving postmortem examination of the pancreas have revealed a frequency of pancreas divisum between 0.8 and 7 percent.[3,4] Studies utilizing endoscopic retrograde cholangiopancreatography (ERCP) have demonstrated an incidence of pancreas divisum of 3.4 and 5.8 percent.[2,5]

A number of reports have demonstrated an association between pancreas divisum and acute and chronic pancreatitis.[5–8] Tulassay and Papp[6] demonstrated pancreatic pseudocysts in three of their 33 patients with pancreas divisum. A review of the literature on pancreas divisum[2,5–8] and pancreatic abscess[9–12] revealed no association between the two conditions. Herein is reported a case of a nonalcoholic patient who presented with a pancreatic abscess. The patient was subsequently discovered at ERCP to have pancreas divisum. No other significant predisposing conditions for the development of pancreatitis or pancreatic abscess were found.

CASE REPORT

A previously healthy 23-year-old, nonalcoholic, obese black woman presented to a hospital because of recurrent abdominal pain, nausea, and vomiting. There was no history of the ingestion of any drugs known to cause pancreatitis. Other than massive obesity (310 lb), the physical examination was unremarkable. At admission, her serum amylase level was elevated to 387 Somogyi units. An abdominal ultrasound showed multiple gallstones at the neck of the

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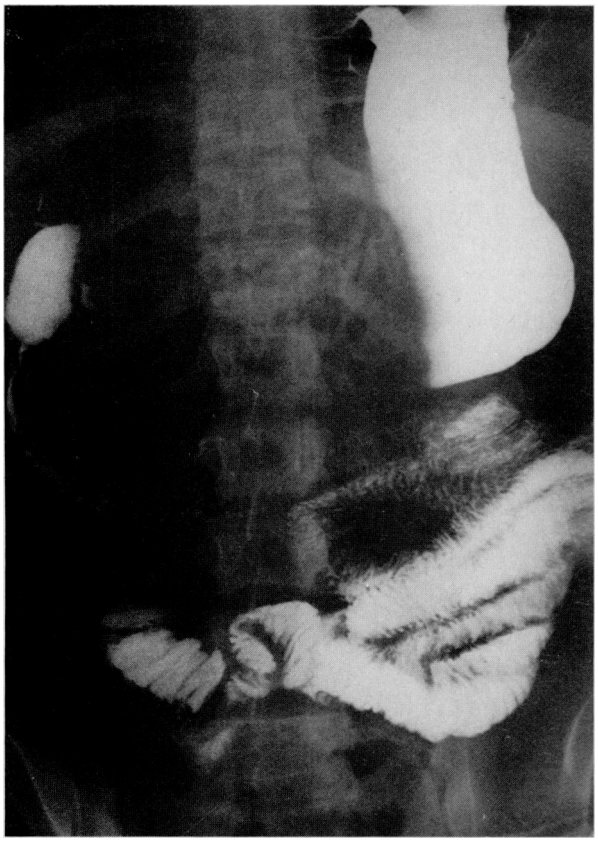

Figure 1. Upper gastrointestinal series demonstrating extrinsic pressure defect on the posterior wall of the stomach and duodenum

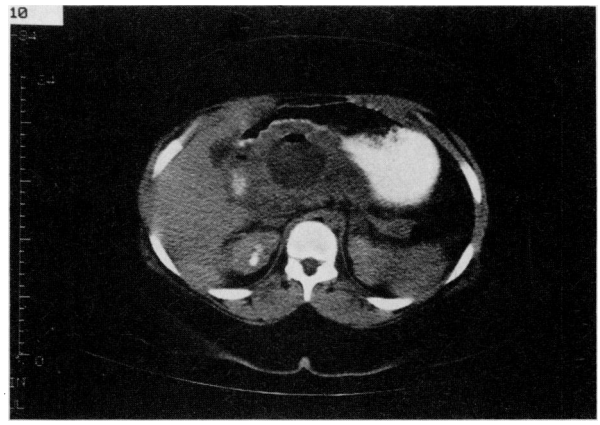

Figure 2. Computerized tomography scan of the abdomen demonstrating a gas-like collection within a large mass at the head of the pancreas

gallbladder, and a cholecystectomy was performed. At surgery, a normal gallbladder was described. In addition, edematous enlargement of the head of the pancreas was noted. Because gallstone pancreatitis was suspected, no biopsy of the pancreas was performed. An operative cholangiogram disclosed no evidence of choledocholithiasis. When the gallbladder was opened, no gallstones were identified. The postoperative course was uneventful; however, the patient had two subsequent admissions to the same hospital within two months for the medical management of acute pancreatitis.

Two and one-half months after the initial surgery, the patient was seen in consultation by one of the authors (D.H.). The presenting complaints were crampy periumbilical abdominal pain, nausea, intermittent vomiting, epigastric fullness, three loose-to-watery stools per day, and weight loss of 44 lb. The physical examination demonstrated normal vital signs, obesity (266 lb), periumbilical abdominal tenderness, and an easily palpable abdominal epigastric mass. An upper gastrointestinal series (Figure 1) demonstrated a large extrinsic pressure defect on the posterior wall of the stomach, duodenal sweep, and upper portion of the small bowel. A 10.6-cm pancreatic pseudocyst was demonstrated with abdominal ultrasound. Because the exact age of the pancreatic pseudocyst was unknown, the decision was made to observe the patient for four to six weeks. Symptomatic treatment of the abdominal pain and nausea was given.

Three weeks later on February 15, 1984, the patient was admitted to the Daniel Freeman Hospital with complaints of right upper quadrant abdominal pain, nausea, progressive weight loss, and recurrent chills and fever.

The physical examination demonstrated a temperature of 98 °F, no icterus, a well-healed surgical scar at the right upper quadrant, and an epigastric mass measuring approximately 10 cm. A computerized tomographic (CT) scan of the abdomen demonstrated a large mass at the head of the pancreas that was associated with an internal low-density area with gas-like collections consistent with an infected pancreatic pseudocyst, pancreatic abscess, or a fistulous communication of the pseudocyst to the bowel (Figure 2). Her complete blood count, chemistry panel, and serum amylase levels were all within normal limits. Broad-spectrum antibiotics with anaerobic coverage were started.

Because the exact cause of the recurrent attacks of pancreatitis, pancreatic pseudocyst, and possible pancreatic abscess was not apparent, ERCP was per-

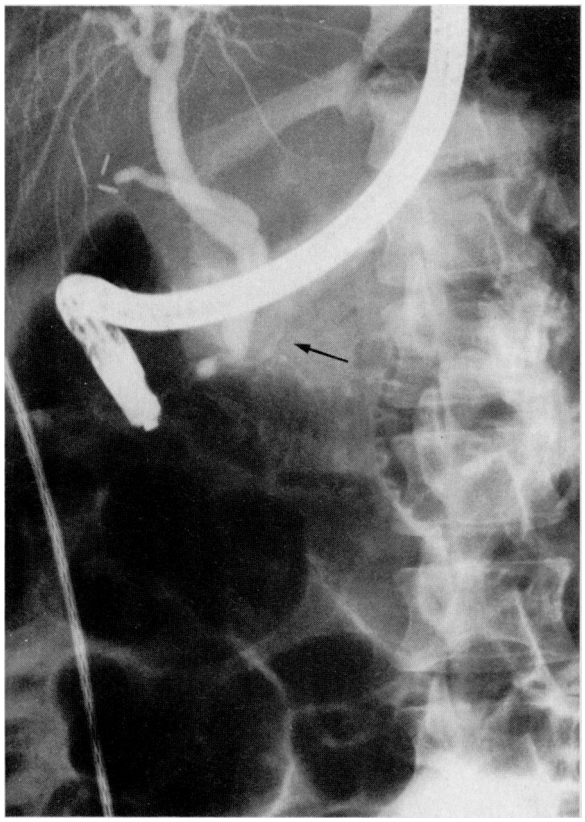

Figure 3. Endoscopic retrograde cholangiopancreatography (ERCP) demonstrating a normal ventral pancreas and biliary excretory system (gallbladder surgically removed)

formed. Pancreas divisum with a normal isolated ventral pancreas and a normal biliary excretory system (gallbladder surgically removed) were demonstrated (Figure 3). Overfilling of the ventral pancreas (Figure 4) did occur; however, the post-ERCP amylase level remained within normal limits. No attempt was made at cannulation of the accessory papilla.

On the seventh hospital day, an exploratory laparotomy was performed. A pancreatic abscess was discovered, and drained internally into the stomach. A Gram stain of the necrotic debris from the abscess cavity revealed many polymorphonuclear leukocytes, many small, pleomorphic, gram-negative rods, many gram-positive cocci that were arranged in pairs, chains, and clusters, and a small number of gram-positive rods. Culture of the abscess debris grew a few β-hemolytic group C streptococci, many peptostreptococcal species, many anaerobic diphtheroids, and moderate amounts of Bacteroides melaninogenicus and Bacteroides asaccharolyticus groups.

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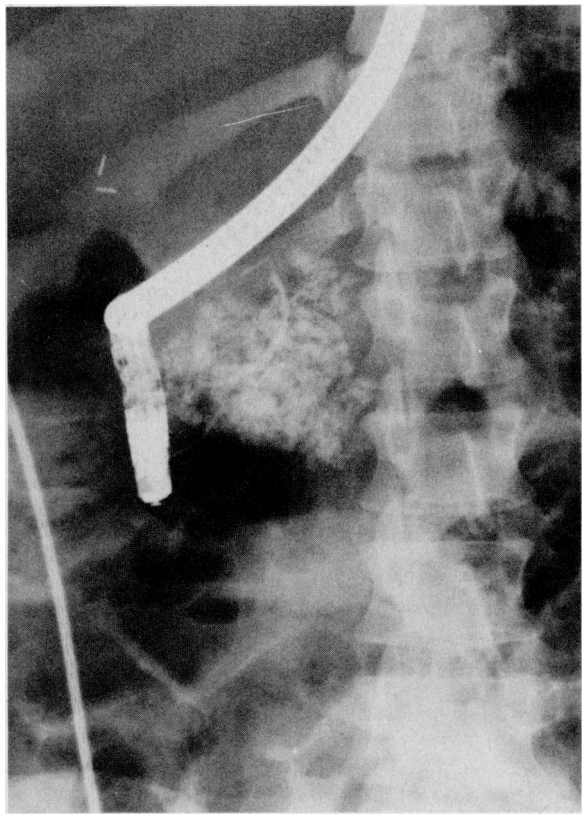

Figure 4. Overfilling of the ventral pancreas at ERCP

Postoperatively, the patient was continued on gentamicin and clindamycin. The postoperative course was uneventful. On the fifth postoperative day, the patient was discharged home. Clindamycin, 450 mg, given orally every six hours was continued for ten days.

At five and 11 months after hospitalization, the patient was seen in an office follow-up and was completely asymptomatic. Her discharge weight remained stable at 231 lb.

Comment

The ERCP on this patient demonstrated a normal ventral pancreas (pancreas divisum). Although the minor papilla was not cannulated, it is believed that the pancreatic pseudocyst, with resultant pancreatic abscess, developed as a result of disease of the dorsal pancreas alone. Because the duct of Santorini drains the dorsal pancreas through the minor papilla, choledocholithiasis could not account for the recurrent attacks of acute pancreatitis that involved the dorsal pancreas. Because the operative cholangiogram and subsequent ERCP did not demonstrate choledocholithiasis, attacks of acute pancreatitis that involved the ventral pancreas would not be expected. In addition, the patient was not using any medications known to cause acute pancreatitis and had no history of chronic alcohol abuse. Since pancreas divisum has been associated with acute and chronic pancreatitis, it is believed that the presence of an infected pancreatic pseudocyst or pancreatic abscess in this patient is more than coincidental.

DISCUSSION

Several large studies utilizing ERCP have demonstrated an association between pancreas divisum and acute and chronic pancreatitis.[5–8] Mitchell et al,[13] however, considered this association to be coincidental. The finding of pancreas divisum at ERCP is clinically significant for the following reasons: (1) the small pancreatic duct of the isolated ventral pancreas has the potential for being misinterpreted by inexperienced observers as representative of pancreatic cancer, resulting in unnecessary surgery,[5] (2) pancreatitis can involve one duct system without involving the other, with a resultant potential for a missed diagnosis if only the normal or nondiseased duct is cannulated,[6] and (3) overfilling of the small pancreatic duct of the ventral pancreas, on the assumption of duct obstruction caused by chronic pancreatitis or pancreatic cancer, can result in acute pancreatitis.[2] Although parenchymal opacification of the ventral pancreas was noted in this patient, acute pancreatitis did not follow the ERCP procedure.

The cause of pancreatitis associated with pancreas divisum has not been established. The most popular theory, proposed by Cotton and Kizu,[14] is that of disproportionate flow of pancreatic juices from the major pancreatic tissue via Santorini's duct through a small accessory papilla. As a result, a functional obstruction is believed to occur with increased back pressure in the pancreatic parenchyma that results in pancreatitis. Whether pancreatic pseudocysts or a pancreatic abscess develops from this proposed mechanism is also unknown. Although pancreatic pseudocyst development has been associated with pancreas divisum,[6] a review of the literature revealed no association of pancreatic abscess with pancreas divisum.

The incidence of pancreatic pseudocyst and pancreatic abscess associated with pancreas divisum is

unknown. In a critical analysis of 113 cases of pancreatic abscess, Cramer et al[10] found no associated conditions in 15 patients. The majority of the patients had biliary tract disease and alcohol addiction. No description of the pancreatic duct was made. Thus, the incidence of pancreas divisum in his series was unknown. Whether pancreas divisum was represented in the group of patients with pancreatic abscess who had no other associated conditions is also not known.

The morbidity and mortality related to pancreatic abscess have clearly been related to a delay in making the definitive diagnosis. The diagnosis of pancreatic abscess was made at admission in this patient with the use of a CT scan of the pancreas. Mendez and Isikoff[15] found CT scanning of the pancreas to be very helpful in the diagnosis and planning of surgical intervention in patients with pancreatic abscess. The finding of intrapancreatic gas that was demonstrated by the CT scan in this patient was pathognomonic of a pancreatic abscess or a fistulous tract between a pancreatic pseudocyst and the bowel.

The condition of pancreatic abscess carries a high mortality rate of between 28 and 50 percent[10–12] regardless of therapy; therefore, early surgical intervention is warranted. Although percutaneous drainage of infected pancreatic pseudocyst is widely available,[16] surgical drainage is the mainstay of therapy for this potentially fatal condition.

Monomicrobial and polymicrobial cultures from pancreatic abscesses have been reported.[10–12] The culture of the necrotic pancreatic debris from the patient reported herein grew multiple organisms. Because of the polymicrobial nature of some pancreatic abscesses, broad-spectrum antibiotic coverage should be instituted as soon as the diagnosis of pancreatic abscess is made.

Hyperalimentation has been shown to be of benefit in reducing the mortality associated with pancreatic abscess,[12] but the case study patient did not receive hyperalimentation. Because of the patient's age and lack of other associated chronic diseases, internal drainage of her pancreatic abscess was followed with an uneventful postoperative course.

Although the findings of a pancreatic abscess and pancreas divisum in the study patient may be coincidental, no other predisposing or associated condition was found to account for chronic pancreatic disease. Therefore, it is suggested that the association of pancreatic divisum with pancreatic pseudocyst and pancreatic abscess is more than coincidental, and it is recommended that further investigation be undertaken in regard to this association.

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