

Pancreatic Pseudocysts — Proposal for Diagnosis and Surgical Management —

Takatoshi SHIMOYAMA, M.D.¹⁾, Hiroshi ISHIKAWA, M.D.²⁾, Teruhisa SHIMIZU, M.D.²⁾, Hiroshi HISANO, M.D.¹⁾, Seiji HONJO, M.D.¹⁾, Satoshi MATSUO, M.D.¹⁾, Yori-hisa SUMIDA, M.D.¹⁾, Seiji MATSUO, M.D.²⁾, Kiyoomi NISHIKAWA, M.D.²⁾, Ryusuke TERADA, M.D.²⁾, Hiroyuki KUSANO, M.D.²⁾, Tohru NAKAGOE, M.D.²⁾, Toshio MIURA, M.D.²⁾, Masao TOMITA, M.D.²⁾, Akio KAWAGUCHI, M.D.³⁾, and Kazuto ASHIZAWA, M.D.⁴⁾

1) Department of Surgery, National Ureshino Hospital, Ureshinocho Fujitsugun, Saga 843-03, Japan

2) First Department of Surgery, Nagasaki University School of Medicine, 1-7-1 sakamoto, Nagasaki 852, Japan

3) Department of Surgery, Inoue Hospital, 8-9 Takaramachi, Nagasaki 852, Japan

4) Department of Radiology, National Ureshino Hospital, Ureshinocho Fujitsugun, Saga 843-03, Japan

To determine the clinical features and problems presented by a pancreatic pseudocyst, eighteen patients managed at our hospitals since 1980 were reviewed. Males predominated with a ratio of 16 : 2, and the average age was 36.2 years. Pseudocyst was located in the pancreatic head in 6, in the body in 6, in the tail in 5 and multiple pseudocysts in one case. The cause of pancreatic pseudocyst was chronic pancreatitis in 9 (including 8 patients with histories of alcoholism), acute pancreatitis in 2 and trauma in 7 patients, respectively. Three patients were associated with pancreatic calculi. Rupture of pseudocyst occurred in one patient with multiple cysts. Autopsy showed acute pancreatic necrosis and penetration to the stomach and duodenum. The indications for surgery were principally cyst-related symptoms (infection, hemorrhage, enlargement and compression of adjacent organs) and differential diagnosis from malignancy. Most of the patients underwent internal drainage; 9 cystojejunostomy, 2 cystogastrostomy). Three patients underwent cystojejunostomy with longitudinal pancreaticojejunostomy for chronic pancreatitis. Massive hemorrhage after cystogastrostomy occurred in one patient with infected pseudocysts, which required removal of the cysts. Postoperative outcome of the 17 surgical patients was excellent in 16 patients. Only one patient died of pancreatitis associated with alcohol abuse, resulting in a 5.9% mortality. This study suggests that adequate internal drainage by pancreaticojejunostomy to treat the underlying pancreatic disease is most important to obtain an excellent prognosis in patients with pseudocysts.

Introduction

Pancreatic pseudocysts are a common complication of acute pancreatitis, occurring in up to 10% of patients¹⁾. Recently, ultrasonographic studies demonstrated an incidence as high as 11 to 53% in acute pancreatitis due to alcoholism²⁻⁴⁾. Pseudocysts are also associated with chronic pancreatitis and pancreatic trauma, either external or

surgical¹⁾. Although recent progress in imaging techniques has resulted in increased detection of pancreatic pseudocysts, there is still an inadequate appreciation of the diagnostic and therapeutic approaches as well as the pitfalls involved. This paper reviews our experiences in diagnosing and managing pancreatic pseudocysts.

Patients and Materials

Since 1980, a total of 18 patients were diagnosed with pancreatic pseudocysts at our hospitals. There were 16 males and 2 females and the mean age of the patients was 36.2 years (range 3.5 to 61 years). The cause of pancreatic pseudocyst was chronic pancreatitis in 9 including 8 associated with alcoholism, acute pancreatitis associated with gallstone in 2 and trauma in seven (Table 1). Three patients were associated with calculi in the dilated pancreatic duct. Pseudocysts were located in the pancreatic head in 5, body in 5, tail in 2 and were multiple in one patient.

Table 1. Cause and Location of Pancreatic Pseudocysts.

Cause of pseudocysts	No. of patients
Chronic pancreatitis	
Alcohol pancreatitis	8
Other	1
Acute Pancreatitis	2
Trauma	7
Location of pseudocysts	
Head	6
Body	6
Tail	5
Multiple	1

Table 2. Indications for Surgical Management of Pancreatic Pseudocyst.

	No. of patients
Infection	3
Abdominal pain associated with a palpable mass	7
Expanding mass	3
Esophageal obstruction	1
Pseudocyst associated with biliary obstruction	1
Differential diagnosis (malignancy)	2
Total	17

Results

Clinical Features

Pain was chief symptoms on admission in all patients. Palpable mass was noted in 7, fever in 4, jaundice in 2 and dysphagia due to compression of the esophagogastric portion by the enlarged pseudocyst was noted in two patients. Three patients had active pancreatitis on admission. Diagnosis was based primarily on ultrasound in 4 patients, physical examination in 3, upper gastrointestinal tract series in 2, CT scanning in 7 and ERCP in 7 patients. Among 13 patients, ultrasound was performed in 9 with 7 correct (78%) with two false-negative (22%) results. In those false-negative cases, US images could not adequately demonstrate the pseudocyst due to the coexistence of pancreatic calculi. ERCP was performed in 9 patients, but there was no evidence of fistula between the pancreatic duct and the pseudocyst.

Pseudocyst rupture occurred in a patient with multiple pseudocysts. This patient was a 56-year-old female who

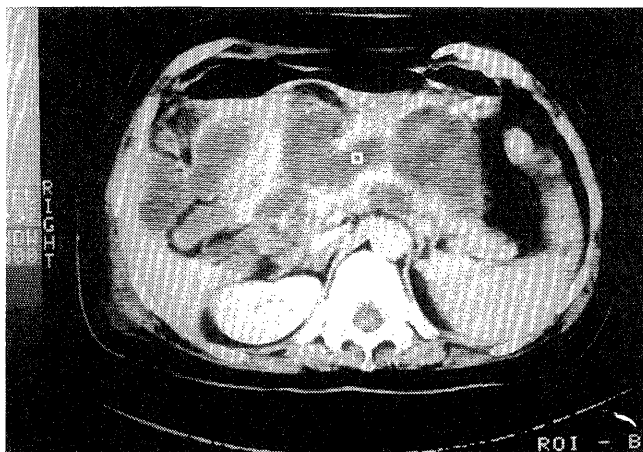


Fig. 1. CT scan of a patient with multiple pseudocysts around the head and body of the pancreas. She died of pseudocysts rupture.

Table 3. Surgical Procedures of Pancreatic Pseudocysts.

	No. of patients
Cystojejunostomy	6
Cystojejunostomy with Peustow procedure	3
Cystogastrostomy	2
Resection of pseudocyst	3
Pancreatoduodenectomy	1
External drainage	2
Total	17

was referred to Nagasaki University Hospital because sudden onset of abdominal pain. She had been diagnosed with Parkinson disease 10 years earlier. CT scan revealed multiple pseudocysts around the pancreatic head (Fig. 1). She was conservatively managed for active pancreatitis as the underlying pancreatic disease in association with subsequent multiple pseudocysts. However, she died of ruptured pseudocysts 32 days after admission. Autopsy revealed acute pancreatic necrosis and penetration of the pseudocysts to the stomach and duodenum.

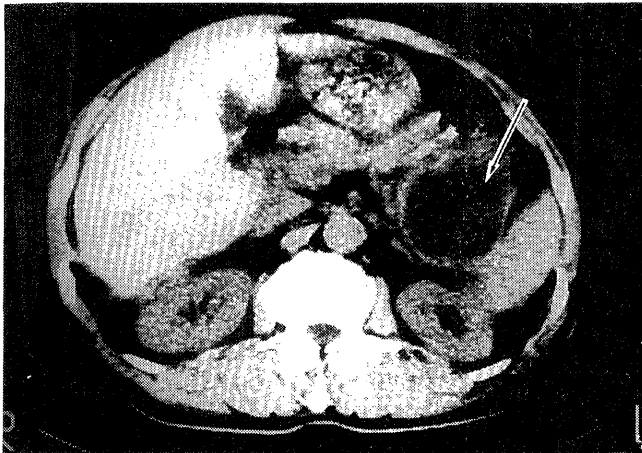
Surgical Management and Prognosis

Indication for surgical treatment in 17 patients are shown in Table 2. In two other patients with hemorrhage, the pseudocyst could not be distinguished from malignant cystic tumor, preoperatively.

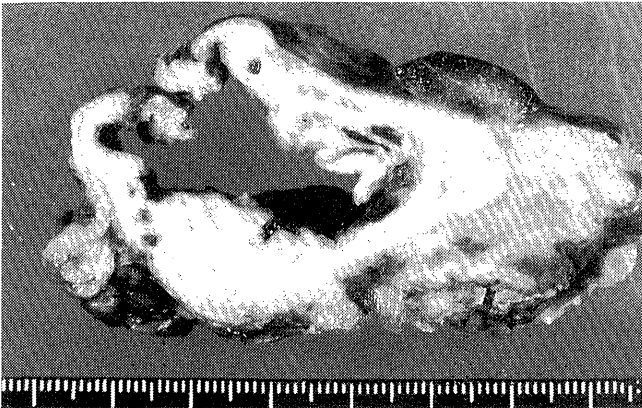
Surgical procedures in the 17 patients who required surgery are summarized in Table 3. Selection of cystogastrostomy or cystojejunostomy was based on cyst location. However, three patients required cystojejunostomy with side-to-side longitudinal pancreaticojejunostomy for underlying chronic pancreatitis. Two patients showed unilocular cyst with wall thickness which could not be differentiated from malignant cystic tumor. One patient underwent pancreaticoduodenectomy for cyst in the pancreatic head, and another patient developed pseudocyst hemorrhage requiring the removal of the cyst along with splenectomy (Fig. 2).

Subsequent surgeries were performed in 2 patients. One patient with cystogastrostomy developed massive pseudocyst hemorrhage associated with infection, which was managed by resection of the pseudocyst 32 days after the initial surgery. Another patient developed a persistent external pancreatic fistula due to external operative drainage of the pseudocyst. He subsequently underwent fistulectomy.

The postoperative outcomes of the 17 surgical patients were excellent in 16 patients. One patient died during the follow-up study resulting in a 5.9 percent mortality. This



A



B

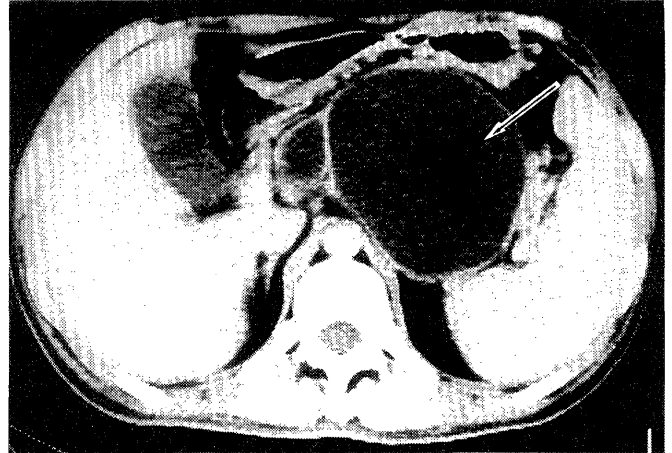
Fig. 2. A : CT scan showing irregular thickening wall of pseudocyst. It was difficult to distinguish the cyst from cystadenocarcinoma.

B : Resected specimen measured 8×6 cm.

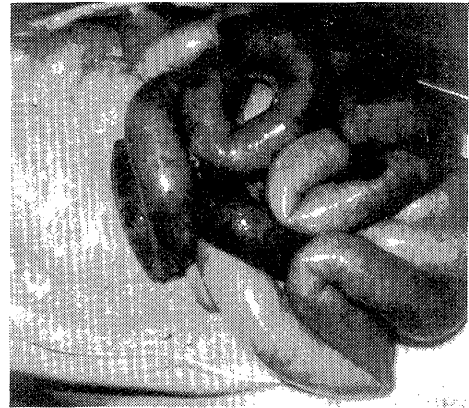
patient was a 33-year-old male with pseudocyst due to alcohol-related pancreatitis (Fig. 3A). He was successfully treated by cystojejunostomy with longitudinal pancreaticojejunostomy, but he died of acute pancreatitis due to massive intake of ethanol one month after discharge. Autopsy showed acute hemorrhagic infarction of the stomach and intestine due to multiple organ failure (MOF) (Fig. 3B).

Discussion

It is generally agreed that patients with pancreatic pseudocyst may be asymptomatic or demonstrate nonspecific symptoms even if the cyst enlarged^{4,9}. In the present series, unusual presentations, such as a palpable abdominal mass, intractable pain, fever, jaundice, dysphagia and periodic follow-up examination for underlying pancreas disease led to cyst detection. The detection rates of



A



B

Fig. 3. A : CT scan of a patient with alcohol-related pancreatitis associated with a pseudocyst measured 13cm.

B : Autopsy showing acute hemorrhagic infarction of the intestine due to MOF.

pancreatic pseudocyst by US, CT and ERCP were described as approximately 90% for each modality^{6,7}. However, the differential diagnosis of a cystic lesion in the pancreas must include a variety of neoplasms, particularly in the absence of antecedent factors or events that could generate a pseudocyst⁹. Irregularity or loculation in the cyst or a solid component noted on CT scan seems to indicate a tumor, but the possibility of a malignant component should still be considered even in absence of such findings on scan^{6,9}. ERCP might be an especially valuable diagnostic adjunct when the biliary tract or pancreatic duct are suspected to communicate with the pseudocyst.

The chief indication in the present series was cyst-related symptoms and this agrees with the surgical indications described in other studies^{4,9}. However, indications for surgical treatment remain controversial. Regarding the natural history of pancreatic pseudocysts, spontaneous regression in 8 to 60% of the instances has been reported^{3,5}. However, a 33 to 40% incidence of serious

complications in patients with untreated pancreatic pseudocysts has been reported^{5,10}. In one of our patients, spontaneous rupture of the pseudocysts occurred during medical treatment for acute pancreatitis. Spontaneous rupture of pseudocysts have been reported in 2 to 20% of patients, almost all of these draining directly into the peritoneal cavity or the gastrointestinal tract resulting in a high mortality rate of 50 to 70 percent¹¹. Several factors contributing to rupture of the pancreatic pseudocysts have been noted; infection, hemorrhage and increasing pressure on the cyst. In our series, rupture occurred in a patient with active pancreatitis. It was considered that a cyst growing expansively in coexisting active pancreatitis was particularly prone to rupture. These physiological factors would seem to play important roles in the pathogenesis of the spontaneous rupture. Rupture of a pseudocyst into the esophagus, portal vein, common bile duct or pleural space has also been reported⁹. Therefore, it is difficult to obtain a balance between careful monitoring and early surgical intervention in patients with pancreatic pseudocysts. Recently, it was reported that the size of the pseudocyst (> 4 cm⁹ or > 6 cm⁴ in diameter) was a significant indicator for surgical drainage, while asymptomatic pseudocysts less than 4 cm or 6 cm in diameter can often be followed with the expectation of complete resolution in most cases and with a low incidence of complications^{4,9}. However, it is generally accepted that a six week period should elapse between an episode of acute pancreatitis and elective internal drainage⁴.

The selection of surgical procedures for pancreatic pseudocysts also remains controversial. Internal drainage seems to be superior to resection or external drainage in the elective management of pseudocysts with regard to the morbidity and mortality rates^{1,4,9}. In the present series, most of the patients were successfully treated with cystoenterostomy. However, massive hemorrhage after cystogastrostomy occurred in one patient with an infected pseudocyst. This suggests that if the patient has severe infections on admission, the internal drainage should be preceded by conservative management until the pseudocyst infection improves. Regarding patients with chronic pancreatitis and pseudocysts, there are three main surgical options - internal drainage of the cyst or bilioenteric bypass combined with pancreaticojejunostomy or resection procedures, such as pancreaticoduodenectomy. Longitudinal pancreaticojejunostomy combined with cystojejunostomy to treat chronic pancreatitis with marked ductal

dilatation seems to provide better long term results than other drainage or resection procedures^{12,13}. We employed these procedures in three patients, expecting to improve the underlying chronic pancreatitis with good results.

Recently, percutaneous catheter drainage (PCD) has become a well established and often preferred alternative to surgical treatment in the management of pancreatic pseudocysts. However, the current data suggest that despite early success with percutaneous drainage, the rate of recurrent pseudocysts remains high^{14,15}. Therefore, the long term success of PCD in the treatment of pancreatic pseudocysts requires further investigation.

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