The Role of Surgery in Pancreatic Pseudocyst

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ABSTRACT

Objective: Surgery was the only option available for management of pancreatic pseudocyst (PP) for many years. Recently, new methods, such as percutaneous drainage, endoscopic transenteric drainage and transpapillary drainage, have been used for treatment of a pseudocyst. However, no single technique offers the desired combination of 100% success and no complications. We present our surgical experience with PP over the past 14 years. Patients and Methods: A total of 22 patients were treated for PP in our departments in Dalin and Hualien Tzu Chi General Hospitals within the last 14 years. They were retrospectively reviewed and followed up. Results: There were 14 (63.6%) men and 8 (36.4%) women between 15 and 79-years-old (mean age 38.2 years). Dominating symptoms in most patients were epigastric pain, palpable mass, nausea, vomiting, fever and leukocytosis, and persistent elevation of serum amylase. Imaging studies, such as ultrasound, computed tomography scan, and endoscopic retrograde cholangiopancreatography, were helpful in establishing the diagnosis. In addition to symptomatic persistent large (> 6 cm) pseudocysts, various complications, including infection, GI obstruction, rupture into the GI tract, peritonitis, GI bleeding, internal bleeding, and pancreatic ascites were indications for surgery in our cases. Operative procedures consisted of external drainage (ED, 9 cases), internal drainage using cystojejunostomy (CJ, 4 cases) and cystogastrostomy (CG, 8 cases), and distal pancreatectomy (1 case). There were ten complications (45.5%) including recurrence of cyst (1 patient with ED and 1 with CJ), recurrence with pancreaticopleural fistula (1 with ED), colon perforation (1 with ED), delayed massive bleeding (1 with CG), pancreatic fistula (3 with ED), pancreatic abscess (1 with CJ and persistent pain (1 with CG). Repeat surgery was needed to stop bleeding (1 patient with CG) and to construct a proximal colostomy for a colon injury (1 with ED). One patient had a CJ for recurrence of pseudocyst 9 years after the first surgery. Percutaneous drainage with a wide bore tube was effective for pancreatic abscess (1 with CJ) and transpapillary drainage with a stent was used to relieve pleural effusion with respiratory failure (1 with ED). No deaths occurred in this series. Conclusion: Although complications do occur in surgical treatment, we believe that it is still important in the management of selected cases of pseudocyst of the pancreas. Surgical intervention, endoscopic drainage, and percutaneous drainage are complementary rather than competing alternatives both for simple and complicated pseudocysts. (Tzu Chi Med J 2004; 16:359-369)

Key words: pancreatic pseudocyst, internal drainage, external drainage, percutaneous drainage, transpapillary drainage

INTRODUCTION

In 1862, Le Dentu [1] proclaimed that cysts of the pancreas "should be relegated to the list of afflictions for which the healing aid is impotent". Fortunately, for the patient in whom a pseudocyst develops as a complication of pancreatitis, this prediction has been proved incorrect. Despite more than 100 years of surgical experience with this disease entity, controversy continues to surround the timing of operative intervention as well as indications for specific procedures.

Surgery was the only option available for many years. In the opinion of most surgeons and many senior
gastroenterologists, surgical drainage is still the treatment of choice. It has been a mainstay in the management of the pseudocyst especially in cases of recurrent or persistent pseudocyst, and cyst rupture, in patients with concurrent common bile duct or duodenal stenosis, in association with dilated pancreatic duct, and in suspected neoplasms. Recently, new methods, such as percutaneous drainage, endoscopic cystoenterostomy, and endoscopic transpapillary drainage have been developed to treat the pseudocyst. However these methods are not widely used because of technical demands and inadequacy of the procedures. With endoscopic internal drainage 10%-50% of patients require surgery [2], and with percutaneous drainage 50%-60% of patients need further treatment [3].

No single technique offers the desired combination of a 100% success and no complications. We reviewed the results of surgical therapy by the same surgical team for pancreatic pseudocysts including various complications at our institutions over the past 14 consecutive years. Only a few papers in this field have been published during last two decades [4-7]. One of the most important reasons is that these cases were not common in our surgical practice. The aim of this paper is to share our surgical experience with this disease entity with our colleagues.

PATIENTS AND METHODS

A total of 22 patients treated for pancreatic pseudocyst presenting with different manifestations at the surgical departments of both Hualien and Dalin Tzu Chi General Hospitals from 1989 through 2003 were collected retrospectively. Pancreatic pseudocysts were confirmed by their lack of epithelial lining on cyst wall biopsy, a high concentration of pancreatic enzymes, and their formation at least 4 weeks after an episode of acute pancreatitis or pancreatic trauma. A small specimen was excised in 11 elective cases and 5 out of 6 infected cases. Only the patients who needed surgery due to acute complications such as infection, peritonitis, ascites, or bleeding or who had a symptomatic PP, were included in this study. The sizes of the PPs were recorded from operative findings or measurement of the PPs on CT images. Pertinent data including age, sex, associated diseases, clinical findings, operative procedures performed, and postoperative course were analyzed. Duration of follow-up was 2 months to 14 years with an average of 5.91 years.

RESULTS

From 1989 through 2000, 17 patients with pancreatic pseudocysts were treated at Hualien Tzu Chi General Hospital. From 2001 through 2003, 5 patients were treated at Dalin Tzu Chi General Hospital by the same general surgery team. The male to female ratio was 14:8. The mean age was 38.2 years (range 15-79 years). Etiologies are listed in Table 1. Alcoholism was the most common cause of pseudocyst. Abdominal pain or fullness was the most common clinical manifestation and was noted in 95.5% (n=21) of patients. Fever and leu-
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ocytosis were detected in most of the complicated cases and a few uncomplicated cysts (n=10, 45.5%). Seven patients presented with a palpable mass in the abdomen (31.8%). There were also some nonspecific gastrointestinal (GI) symptoms such as nausea and vomiting in nearly half of the cases.

Objective documentation of a pancreatic pseudocyst was obtained by ultrasonography (n=17, 77.2%) (Fig. 1A), computed axial tomography (n=18, 81.8%) (Fig. 1B), or endoscopic retrograde pancreatography (n=5, 22.7%). Most of the PPs resolved and were followed by sonography (Fig. 2A) and CT (Fig. 2B). The indications for surgery and the procedure performed are summarized in Tables 2 and 3, respectively. The sizes of the PP could be recorded for 13 elective cases and 7 emergency cases. All of the PP measured more than 6 cm and the average size was 8.2 cm. Eleven cysts were larger than 10 cm. The largest one measured 40 × 30 × 15 cm and occupied more than half of the abdomen including the pelvic cavity. ERCP was performed in 5 cases and four were done preoperatively. One was done for a patient with a recurrent cyst complicated by respiratory failure from massive pleural effusion secondary to a pancreaticopleural fistula. The problem was solved by transpapillary drainage by an endoscopist. The cyst was infected in a case following ERCP and urgent laparotomy with external drainage was performed. Percutaneous drainage under sonography or CT was done in 4 cases, 2 with postoperative pancreatic abscesses and 2

Table 1: Presumed Causes of Pancreatic Pseudocyst

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number (%)</th>
</tr>
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<tbody>
<tr>
<td>Alcohol</td>
<td>10 (45.5%)</td>
</tr>
<tr>
<td>Biliary</td>
<td>2 (9.1%)</td>
</tr>
<tr>
<td>Alcoholic and trauma</td>
<td>2 (9.1%)</td>
</tr>
<tr>
<td>Trauma</td>
<td>3 (13.6%)</td>
</tr>
<tr>
<td>Hyperlipoidemia</td>
<td>1 (4.5%)</td>
</tr>
<tr>
<td>Idiopathic</td>
<td>4 (18.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>22 (100%)</td>
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</tbody>
</table>

Table 2: Indications for Surgery

<table>
<thead>
<tr>
<th>Type of Presentation</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptomatic, persistent large pseudocyst (&gt; 6 cm)</td>
<td>11</td>
</tr>
<tr>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>Infected cyst</td>
<td>6</td>
</tr>
<tr>
<td>Free rupture with peritonitis</td>
<td>1</td>
</tr>
<tr>
<td>Rupture into stomach with peritonitis</td>
<td>1</td>
</tr>
<tr>
<td>Ruptured pseudoaneurysm (gastroduodenal) into duodenum or peritoneal cavity</td>
<td>2</td>
</tr>
<tr>
<td>Pancreatic ascites</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
</tr>
</tbody>
</table>

Fig. 2. Sonography is as good as CT in postoperative follow-up. (A) Shrinkage of the cyst seen on sonography. (B) No definite cyst is seen behind the stomach.
with recurrent pseudocysts. Preoperative usage of drainage catheter in one case was unfortunately complicated with leakage of pancreatic juice around the catheter leading to diffuse peritonitis.

Operative procedures used in these patients are listed in Table 3. All complicated cysts except one infected cyst were drained externally. Internal drainage was carried out in another 12 symptomatic matured pseudocysts and a distal pancreatectomy was done in a patient with PP at the tail. All biopsies showed a thick fibrous wall devoid of mucosa. Cystogastrostomy was performed in more than half of the patients (66.6%, Fig. 3). Suture ligation outside the cyst for a bleeding pseudoaneurysm was done in two cases and partial gastrectomy was added for a case presenting with a cyst perforation into the stomach. Significant morbidity occurred in 10 of 22 patients (45.5%), six of which (60%) occurred in patients with external drainage: three cases of pancreatocutaneous fistula, two cases of recurrence of pseudocyst, and one case of colon perforation. All three fistulas closed spontaneously with conservative management which included total parenteral nutrition followed by enteral feeding. One of the recurrent pseudocysts was treated first with percutaneous drainage. Endoscopic stenting at the initial attempt failed.

Table 3. Operative Procedures

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External drainage</td>
<td>9 (40.9%)</td>
</tr>
<tr>
<td>Internal drainage</td>
<td></td>
</tr>
<tr>
<td>Cystogastrostomy</td>
<td>8 (36.4%)</td>
</tr>
<tr>
<td>Cystojejunostomy</td>
<td>4 (18.2%)</td>
</tr>
<tr>
<td>Distal pancreatectomy</td>
<td>1 (4.5%)</td>
</tr>
<tr>
<td>Total</td>
<td>22 (100%)</td>
</tr>
</tbody>
</table>

Fig. 3. Cystogastrostomy. (A) Localization of the PP by transgastric approach. (B) Cystogastrostomy was done with non-absorbable interlocking sutures.
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Fig. 4. Recurrence of PP. (A) Sonographic findings after ED. (B) CT findings after ED. (C) CT findings after percutaneous drainage.

Fig. 5. Pancreaticopleural fistula following ED. (A) Massive pleural effusion. (B) CT findings of markedly collapsed right lung. (C) ERCP shows pancreatic ductal leakage. (D) Resolution of PP after transpapillary drainage.
Unfortunately, it recurred (Fig. 4A, 4B, 4C) and was complicated by a pancreaticopleural fistula associated massive pleural effusion and respiratory failure eight months later (Fig. 5A, 5B, 5C). However, it finally responded well to transpapillary stent insertion (Fig. 5D). Urgent proximal colostomy was done for colon perforation and reconstruction was carried out a half year later. Two recurrences occurred in the cystojejunostomy (CJ) group and only one of them needed repeat internal enteric drainage 9 years later because of biliary obstruction. The other patient had percutaneous aspiration and did not require repeat surgery. One patient in the cystogastrostomy (CG) group had delayed massive bleeding, prompting surgery for cessation of anastomotic bleeding on the seventh postoperative day. A case with a giant cyst (Fig. 6A) treated by CJ was complicated with pancreatic abscess which was finally resolved by percutaneous drainage with a large bore drain tube (Fig. 6B, 6C). No operative deaths occurred.

DISCUSSION

A PP is an extravasated collection of exocrine pancreatic juice surrounded by a fibrous membrane made of adjacent viscera and parietal wall devoid of an epithelial lining [8-10]. Controversies in the surgical treatment of PP include the optimal time for intervention, the choice of surgical technique and the choice of management of complications. In addition to the surgery, appropriate use of diagnostic imaging studies and nonoperative techniques are the fundamentals of success in the management of the PP.

PP is seen in over 10% of pancreatitis cases as a
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result of pancreatic inflammation, trauma, or duct obstruction. As in most other case series, alcohol-related pancreatitis was the most common association with pseudocysts in our series [5]. PP should be suspected in patients with acute pancreatitis whose symptoms fail to resolve within 7 to 10 days or in patients with chronic pancreatitis who complain of persistent pain, nausea, or vomiting. Epigastric pain or fullness occurred in 95.5% of our patients, but a lower percentage (n=7, 31.8%) had a palpable abdominal mass.

The most reliable diagnostic tools are ultrasound and CT scanning. Hessel found ultrasound to be 90% accurate and 98% specific when the pancreas could be visualized. Unfortunately gas obscures the pancreas in nearly one third of patients. CT scan has higher sensitivity and specificity, reveals retroperitoneal extension, and shows the relationship between the cyst and the adjacent enteric lumen [11]. CT and ultrasound were equally accurate for diagnosis of the cyst in our cases as most cysts were >5 cm in diameter (Fig. 1). We analyzed the diagnostic procedures in 80% of our non-emergency cases. An initial preoperative CT scan with correlated sonography followed by serial sonographic examinations was very effective in showing resolution (Fig. 2) or recurrence of the cyst (Fig. 4) before and after the operative treatment.

Endoscopic retrograde cholangio-pancreatography (ERCP) demonstrates abnormalities of the pancreatic duct in up to 90% of patients with pseudocyst and nearly two-thirds of the pseudocysts communicate with the pancreatic duct. ERCP can provide valuable information concerning the natural course of pseudocysts and selection of suitable candidates for nonoperative management. Several studies suggested routine ERCP as it might change the operative management in nearly 60% of cases with improved outcome [8,12]. But it might exacerbate acute pancreatitis and infection, and there are other endoscopic related side effects such as bowel perforation or bleeding. We use ERCP only in elective cases without maturation of the wall on CT image. Percutaneous drainage may be considered if ERCP shows no communication between the cyst and pancreatic duct. Transpapillary pancreatic stenting may be used in cases with a connection, as well as in patients suspect of having pancreatic cancer and in those reluctant to have surgery. Otherwise, the appropriate operative procedure is straight forward for uncomplicated cases. It should be performed within 24-48 hours before a planned drainage procedure under the umbrella of antibiotics. The advent of sonography and CT scan of the abdomen in 1970s clearly established that approximately 50% of pseudocysts resolve spontaneously [6,13-15]. A review of the literature also reveals that up to 40% of patients with untreated PP develop complications [11]. Resolution and development of complications of PP were therefore thought to be a function of time. As a matter of fact, it is a great challenge for a surgeon to decide the timing of an operation to avoid unnecessary consequences. However, there are few longitudinal studies of pseudocyst. The Mayo clinic experience reported by Vitas and Sarr [6] reviewed 68 asymptomatic patients with a mean follow-up of 51 months and 63% remained asymptomatic. A similar study by Yeo at el [15] at John Hopkins University included 36 patients and spontaneous resolution occurred in 69% of the cases by the 1 year follow-up. However, both studies had a short follow-up duration (1 to 4 years) and the PP were small to average sized.

Table 4. Postoperative Morbidity and Management with Different Operative Methods

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Complications</th>
<th>Number (%)</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>External drainage</td>
<td>1. Recurrence</td>
<td>1</td>
<td>Aspiration</td>
</tr>
<tr>
<td></td>
<td>2. Recurrence with pancreaticopleura</td>
<td>1</td>
<td>Transpapillary drainage</td>
</tr>
<tr>
<td></td>
<td>3. Colon perforation</td>
<td>1</td>
<td>Colostomy</td>
</tr>
<tr>
<td></td>
<td>4. Pancreatic fistula</td>
<td>3</td>
<td>Conservative</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>6 (60%)</td>
<td></td>
</tr>
<tr>
<td>Internal drainage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cystogastrostomy (CG)</td>
<td>1. Internal bleeding</td>
<td>1</td>
<td>Reopened one week later</td>
</tr>
<tr>
<td></td>
<td>2. Persistent pain</td>
<td>1</td>
<td>Conservative</td>
</tr>
<tr>
<td>Cystojejunostomy (CJ)</td>
<td>1. Recurrence</td>
<td>1</td>
<td>Cystojejunostomy</td>
</tr>
<tr>
<td></td>
<td>2. Pancreatic abscess</td>
<td>1</td>
<td>Percutaneous drainage</td>
</tr>
<tr>
<td>Resection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distal pancreatectomy</td>
<td>Nil</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>4 (40%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>10 (100%)</td>
<td></td>
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firmed the value of a waiting period. Spontaneous resolu-
tion occurs in 40% of acute pancreatitis with a dura-
tion less than 6 weeks, and the complication rate is only 20%. A waiting period longer than 7 weeks, however, was associated with a 56% complication rate and resolu-
tion was observed in only 1 of 25 patients from 7-18 weeks. But a current review of recent studies by Pitchumoni and Agarwal [17] revealed that one former absolute that a 6 cm pseudocyst present for 6 weeks or more requires surgery, is absolutely untrue.

We had a 50% (11/22) complicated cases and al-
though there was no mortality, they were often associated with severe morbidity. As all PP were diagnosed at the first visit, we did not know how long the patients had a PP. Also, elective cases with larger pseudocysts had some complications. Two cases with huge PP (>15 cm) sustained pancreatic infections, in one case after ERCP and in the other patient after percutaneous drain-
age was followed by leakage of pancreatic juice with diffuse peritonitis. A third patient had severe hemodynamic changes and a pancreatic abscess following in-
ternal drainage due to sudden massive fluid loss and poor drainage, respectively. A huge PP may be more diffi-
cult to handle than an average sized PP (6 cm to 10 cm). Another factor was that our patients with complicated PP often had a history of alcoholism (7/11). One symp-
tomatic patient with an immature cyst wall had a recur-
rence after external drainage (Fig. 4A, 4B, 4C) and se-
vere pulmonary effusion due to pancreaticocutaneous fistula after percutaneous drainage (Fig. 5A, 5B, 5C). It was successfully treated with transpapillary drainage (Fig. 5D). Pitchumoni's suggestions are rational [17] but the former 6 cm-6 weeks criteria should still be a relative indicator rather than an absolute one.

Surgical drainage has been the gold standard for man-
aging PP. However, it may be associated with sig-
nificant morbidity and mortality as mentioned above. Despite the relatively limited experience in the use of percutaneous drainage and recurrence and failure rates ranging as high as 25% to 79%, this method has been increasingly recommended as the first line of treatment [3,18-22]. VonSonnenberg et al reported a 94% cure rate in 51 patients with infected PP treated by percutaneous drainage. The fistula usually closed in less than 30 days [21]. Adams and Anderson [22] reviewed 52 patients with an average hospital stay of 40 days and the dura-
tion of fistula drainage was 42.1 days. Sometimes these patients failed to respond and required surgery [23]. We used percutaneous drainage in a patient with a large in-
fected PP with systemic toxemia. But it was compli-
cated with leakage around the catheter with diffuse peritonitis. On the other hand, a postoperative pancre-
atic abscess with sepsis can be controlled through a wide bore drain tube. Theoretically, endoscopic drainage of PP mimics operative internal drainage. But an inherent problem with endoscopic drainage is that not all PP are continuous with the stomach or duodenum. In addition, it is technically demanding and widely known for initial success but early recurrence [24]. One patient in the ED group with pancreaticopleural fistula even after percu-
taneous drainage for operative recurrence was cured with transpapillary drainage and has been stable until the most recent follow-up.

We generally use surgical intervention as an initial treatment for cases fit for anesthesia and operation. For selected cases such as those with infected PP with fri-
able thin walls, thin PP without ductal leaks, or unstable clinical conditions, we may use percutaneous drainage. The endoscopic transpapillary approach is chosen for symptomatic cases with thin walls or ductal leaks or in patients who are reluctant to have surgery.

Complete dependent drainage is critical in any in-
ternal drainage procedure. Cystogastrostomy is used when the cyst wall is adherent to the posterior gastric wall (Fig. 4). If the cyst wall is adherent to the duodenal wall, cystoduodenostomy should be performed. Cystojejunostomy is used when the cyst is not closely adherent to the upper gastrointestinal tract and is located at the base of the transverse mesocolon. It is also sug-
gested for extremely large PP (>15 cm) to achieve de-
pendent drainage [11,17].

Infected pseudocyst presents as a secondary infec-
tion of a previously sterile pseudocyst. The chance of infection increases with time and occurs in approximately 10%-15% of patients [16]. Infection may be due to translocation of bacteria from the GI tract, or secon-
dary infection from an intracystic hematoma or it may be iatrogenic after puncture or ERCP [25]. External drainage is the traditional surgical therapy for infected pseudocyst, since the creation of an anastomosis in an infected field is thought to be unsafe. But development of pancreaticocutaneous fistula occurs in 12%-20% of patients [26]. Djamila Boerma [27] proved internal drain-
age is safe and effective in selected cases with a firm cyst wall which can hold an anastomosis well. We used this technique in only one of 5 patients with infected PP. That patient had an uneventful outcome. The remain-
ing 4 patients had diffuse peritonitis or associated sys-
temic toxemia and one of whom was complicated with a colon perforation and two of whom had prolonged hospital stays because of pancreatic fistulas. We sug-
gest ID for an infected PP if the patient is stable and there is a mature cyst wall.

The mortality and recurrence rate for ED and ID
are 10% vs 3% and 18% vs 8% respectively [17]. Ten percent of persistent pancreatic fistulas treated by ED may require a distal pancreatectomy or drainage into the Roux limb of the bowel. In our series, ED was associated with higher morbidity than internal drainage (n=6, 60% vs n=4, 40%) (Table 4). This was significantly higher than the 23% reported by Balfour [28] and quite similar to 72.7% and 61% noted in Brian et al [4] and Shatney’s [29] series respectively. This might basically be due to the complex state of the disease itself and lack of a chance to evaluate the pancreatic ductal condition in an emergency.

One patient in each group (ID or ED) needed repeat surgery during the same hospitalization, one due to bleeding and one due to inadvertent colon injury with perforation. Endoscopic intervention (transpapillary drainage) in a patient with a pancreaticopleural fistula in the ED group and radiologic intervention (percutaneous drainage) in a patient with postoperative pancreatic abscess in the ID group prevented repeat surgery. Therefore, a multidisciplinary approach by a well-experienced team composed of surgeon, endoscopist, and radiologist is fundamental for the best outcomes. Seventy to eighty percent of the fistulas close spontaneously within 4 months. But high output (>200 cc/day) appears to extend the duration of closure [30]. Three in our ED group had pancreatic fistulas and they were managed with total parental nutrition (TPN) in the early days followed by jejunostomy feeding in all patients. Nobody required repeat surgery or prolonged TPN. All fistulas closed within 1-2 months. Consequently, less intervention was needed in the ED group (33.3%) in contrast to the ID group (50%). There was a significantly lower incidence of repeat surgeries, 16.6% (one out of 6 cases) in the ED group compared to 75% (3 out of 4) in ID group. Early TPN combined with routine use of early jejunostomy feeding may be the most important strategy. We encountered massive bleeding from the anastomosis in a cystogastrostomy patient 7 days after surgery which required emergency- repeat surgery for hemostasis. The incidence ranged from a few cases as in our study and another study [31] up to 50% [32] though there have also been a few studies without this life-threatening complication [4]. This has been attributed to a reflux of digestive juices with enzymatic activation [33] on absorbable sutures. Non-absorbable sutures with an interlocking suture method may secure hemostasis better along cyst-enteric anastomosis. Interestingly, pseudocyst recurred in one patient 9 years after an initial cystojejunostomy and it was associated with biliary obstruction.

A giant cyst should be dependently drained by ID [11,17]. But this led to severe complications with sudden unstable hemodynamic changes and pancreatic abscess. (Fig. 6A, 6B) in immediate postoperative period. Massive fluid loss and inadequate drainage with contamination of the PP by intestinal contents from the non-functional limb of the Roux loop into the cavity explains this complication. Johnson et al reported this complication in three of four patients with giant PP (>15 cm) and two of the patients died. They concluded that CJ may not be an appropriate treatment for giant PP because it might not provide dependent drainage [34]. Usage of transpapillary drainage in combination with percutaneous drainage may be a good alternative in these cases if we can prove there is a communication between the PP and the pancreatic duct. If surgery is chosen, external drainage should be considered.

Formerly, operative mortality was high (8.6% to 16%) but it has been reduced significantly in recent years to 0% to 5% [35,36]. We had no deaths in our series although complicated cases with emergency surgery were included.

In summary, we surgically treated 22 symptomatic cases of PP with or without complications from 1989 through 2003. They presented with abdominal pain or fullness. Ultrasonography and CT were equally effective for diagnosis. Sonography was favored because it is noninvasive, cheaper, and convenient for follow-up. CT scanning was also helpful for evaluation of localization, extent, and correlation with surrounding structures, and as an image guide for drainage. External drainage of the PP was associated with higher morbidity than ID. But only one patient in each group needed repeat surgery. Percutaneous drainage or endoscopic drainage is a good tool in the perioperative period. These techniques, when coordinated with a team approach, result in the best outcome.

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外科手術在胰臟假性囊腫所扮演的角色

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摘要
目的：許近年來，外科手術一直是對胰臟假性囊腫唯一的有效選擇。但近年來，有了新的治療方式，如經皮引流、內視鏡引流和經導管引流等。我們必須承認，並沒有任何一種單獨的治療方式可以達到100%的成功且無併發症的產生。本文提供過去14年，我們在外科手術上的經驗，來跟大家一起分享。病人與方法：在過去的14年(1999~2003)中，大林慈濟外科和花蓮慈濟外科共同診斷並外科治療22位胰臟假性囊腫病人。直到目前為止，他們接受持續跟蹤。結果：其中男性14人(63.6%)，女性8人(36.4%)，年齡為15-79歲之間(平均年齡38.2歲)。病患出現主要的症狀為：上腹部疼痛、硬塊、噁心、嘔吐、發燒和和維持升高的血清澱粉酶。影像檢查，例如：超音波、電腦斷層掃描、膽胰管內視鏡，對於臨床診斷是很有幫助。手術適應症包含了持續增大的假性囊腫合併腹膜及腹痛、感染、腸胃道阻塞、穿孔、出血、腹膜炎、腹內出血和胰臟性腹水。有效的方式包含腹膜外引流(external drainage, ED: 9位)、腹腔內引流胰囊腫空腸吻合術(cystojejunostomy, CJ: 4位)與胰囊腫形胃腸吻合術(cystogastrostomy, CG: 8位)及遠端胰切除術(1位)。十例併發症(45.5%)包括囊腫復發(1 in ED and 1 in CJ)、胰腫膜瘤管(1 in ED)、結腸穿孔(1 in ED)、延遲性大量出血(1 in CG)、胰臟囊腫(3 in ED)、胰臟囊腫(1 in CJ)及持續性腹痛(1 in CG)。術後三位病患需再次進行手術以減緩術後出血(1 in GD)及施行結腸造口術來處理結腸穿孔併發症(1 in ED)，及術後九年復發胰臟種假性囊腫亦以手術治療(1 in CJ)。另有兩位再復發病患使用非手術治療方式，其一以較小的管路進行經皮穿刺引流胰臟囊腫，一復發至呼吸衰竭的病患則需使用支架經導管塗腹引流，均能有效處理。在這個研究中並無死亡病例。結論：我們相信外科手術在治療各種不同胰臟假性囊腫扮演一個很重要的角色。但我們也發現在臨床上需要外科手術來彌補手術無法改善的缺點。所以適當的應用上述各種非手術方法並和外科手術相輔相成，以達到最好療效才是最重要的。(慈濟醫學 2004; 16: 359-369)

關鍵語：胰臟假性囊腫，腹腔內引流，腹腔外引流，經皮穿刺引流，經導管塗腹引流

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