# Experience with Surgical Internal Drainage of Pancreatic Pseudocyst

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*Background:* Pancreatic pseudocyst is an uncommon disorder in Nigeria compared with the Caucasian population.

*Objective:* This study was carried out to determine the pattern and outcome of surgical management of the disease in a Nigerian population.

*Methods:* The authors reviewed the records of 10 consecutive patients with pancreatic pseudocysts who were surgically managed in Aminu Kano Teaching Hospital, Kano, Nigeria, from November 1998 to October 2005.

*Results:* There were four males and six females, with a mean age of 19.2 years. The etiological factors included idiopathic acute pancreatitis in a two-year old child and blunt abdominal trauma in two patients. In seven patients, the cause could not be determined. The most common clinical features included epigastric pain, fever, intra-abdominal mass and vomiting. The duration of symptoms ranged from 15–204 days (mean=102 days).

Open cystogastrostomy was done in eight patients, and two patients had cystoduodenostomy. The mean duration of hospital stay after surgery was 9.4 days (range=7–15 days).

There was no recurrence in any of the patients after about 3–9 months of follow-up with ultrasonography, and no death was recorded.

*Conclusion:* Open surgical internal drainage is safe and effective with low morbidity and mortality. There is a need for provision of facilities for minimally invasive laparoscopic and endoscopic techniques.

**Key words:** pancreatic pseudocyst ■ etiology ■ ultrasonography ■ surgery ■ outcome

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## INTRODUCTION

Pancreatic pseudocyst is the most common cystic lesion of the pancreas.[1] It occurs in association with inflammatory conditions of the pancreas such as severe acute pancreatitis, chronic pancreatitis and pancreatic trauma.[2] Pancreatic pseudocyst can be intrapancreatic and, more commonly, extrapancreatic with the most common site of involvement being the lesser sac.[1,2] Rare locations include the paracolic gutters, pelvis and the mediastinum, when it extends along tissue planes.[2]

The therapeutic options include surgical internal drainage, endoscopic drainage techniques and percutaneous catheter drainage (PCD) methods.[3]

The authors report their experience with surgical internal drainage of 10 cases of pancreatic pseudocyst in Nigerians and review of literature.

## MATERIALS AND METHODS

Ten patients with pseudocyst of the pancreas were managed by the authors from November 1998 to October 2005. Cystic neoplasms of the pancreas were however excluded from this study, which was carried out to document our experience with surgical internal drainage of pancreatic pseudocyst.

The case notes of the patients were retrieved and reviewed. The data collated included the age, sex, clinical features, etiologic factors, preoperative investigations, operative findings, types of operations and outcome of management.

The diagnosis of pseudocyst was made mainly by clinical features and imaging. Hematological and biochemical parameters were evaluated in all the patients.

Preoperative preparations included correction of fluid and electrolyte deficits, blood transfusion and nutritional rehabilitation in some cases. At surgery, preliminary aspiration of the cysts was done with a size-21 G needle to exclude pseudoaneurysm. Six cloudy aspirates were sent for bacterial cultures. After incision, the interior of the cyst was inspected and the walls biopsied to exclude neoplastic cysts of the pancreas.

Patients were followed up with ultrasonography to detect recurrence.

## RESULTS

There were four males and six females. The ages ranged from 2–37 years with a mean of 19.2 years. There were six adults and four children.

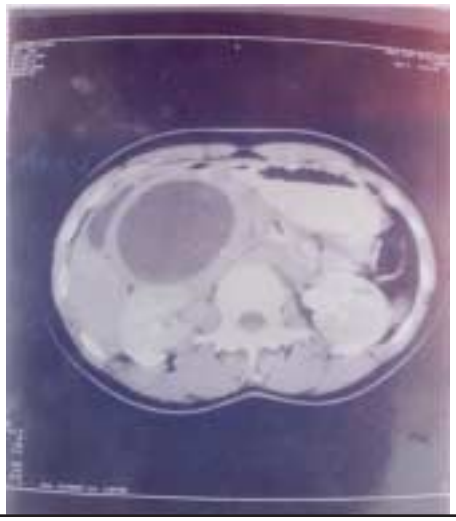
Two patients had a prior history of road traffic accidents. A two-year-old child who presented with features of acute abdomen was found to have acute hemorrhagic pancreatitis at exploratory laparotomy and developed pseudocyst three weeks later, which did not resolve after about seven weeks of expectant management. In seven patients, the cause was not apparent. None of the patients had gall stone disease or had any prior history of alcoholic ingestion.

The features of the disease in the 10 patients are shown in Table 1. Epigastric pain, fever, intra-abdominal mass and vomiting were common features in the patients. Anemia was seen in seven patients, wasting in four and jaundice in two. The duration of symptoms prior to presentation ranged from 15–204 days (mean=102 days). Eight out of 10 patients were managed in peripheral hospitals for several weeks prior to presentation in our unit.

Seven patients had a low packed cell volume, but leukocyte counts were within normal ranges. Three patients had hypokalemia, while other electrolytes were normal. Serum amylase was not estimated for lack of reagents.

Abdominal ultrasonography detected pseudocysts accurately in eight patients and revealed well-defined sonolucent masses of different sizes with smooth walls posterior to the stomach or the duodenum. One of them had a CT scan to confirm diagnosis (Figure 1). Ultrasonography could not detect pseudocysts in two patients, as the findings were suggestive of hepatic cyst and splenic abscess respectively, but pancreatic pseudocysts were confirmed at exploratory laparotomy. All the cysts walls were mature at presentation with thickness ranging from 5.5–10 mm on ultrasound (US) scan.

**Figure 1. Contrast-enhanced CT scan of a unilocular pancreatic pseudocyst adherent to the posterior wall of the duodenum treated by cystoduodenostomy**



Out of the 10 patients, eight underwent cystogastrostomy and two had cystoduodenostomy. The procedures were performed within 7–21 days of in hospital admission. The cysts contained about 500–2,000 ml of fluid (mean=1,310 ml). Only one out of the six cyst fluid cultures grew *Escherichia coli*.

The duration of hospital stay ranged from 7–15 days (mean=9.4 days). There was no significant postoperative complication, and recurrence was not detected after a follow-up period of about 3–9 months. No death was recorded in this study.

## DISCUSSION

Pseudocyst of the pancreas accounts for about 75–80% of cystic lesions of the pancreas,[1] and the incidence of the disease is based on the prevalence of pancreatitis in a particular location. It is an uncommon disorder in Nigeria,[4,5] and this may probably be due to underreporting in the absence of modern abdominal imaging facilities in our subregion.[5] Pancreatic pseudocyst complicates episodes of acute pancreatitis in about 7–15% of cases as a result of glandular necrosis and disruption.[3] Pseudocysts are more common in alcoholic pancreatitis than gall stone pancreatitis.[2] Although alcohol may be well consumed in large quantities in our subregion, acute pancreatitis is uncommon, as seen in this report and others.[4,5] Blunt or penetrating abdominal trauma can also give rise to pancreatic pseudocyst, most commonly in children, and in about 3–8% in adults.[2,6] In one study, blunt trauma was the cause in 69% of cases in children.[6] Abdominal trauma is common in our environment, but pancreatic injuries are uncommon, likewise trauma-related pseudocyst.[4,5,7]

Most pseudocysts are uncomplicated with few nonspecific symptoms, except when they are large;[3] therefore, a high index of clinical suspicion is necessary to make an early diagnosis. The majority of the patients in this report presented late with epigastric pain, fever, vomiting and cystic epigastric mass. This tetrad of clinical features is pathognomonic of pancreatic pseudocyst in our center. Although 90% of our patients were pyrexic at presentation, only one out of six (16.6%) aspirate cultures yielded microorganisms. Bacterial cultures of cyst fluid are said to be positive in about 20–50% of patients cultured in some series, even though this figure might be influenced by selection bias.[2] Uncommon modes of presentation that might occur with complicated pseudocyst include bleeding, gastric outlet obstruction, rupture, infection of the cyst and jaundice due to obstruction of the intrapancreatic segment of the common bile duct.[1,2] Jaundice occurred in two patients in this report and disappeared after the drainage procedures.

Abdominal ultrasonography and CT scan are impor-

tant in the initial evaluation of patients with pseudocyst of the pancreas. The sensitivity rate of US for the detection of pseudocyst is about 75–90%, compared with 90–100% for CT scan.[7] Abdominal ultrasonography was highly sensitive in demonstrating pancreatic pseudocyst in our patients, similar to other reports. Although CT scan provides more detailed information, the cost is prohibitive to the generality of our patients and so it was used sparingly in our center. The use of color Doppler or duplex scan or, alternatively, preoperative angiogram helps to rule out pseudoaneurysm, which is an important source of bleeding complications.[8] Other modalities of investigations include endoscopic ultrasonography, endoscopic retrograde cholangiopancreatography and magnetic resonance imaging (MRI).[9] These imaging techniques provide better images of the ductal system and adjacent pseudocyst, but they are, however, limited in our subregion.

Most pancreatic pseudocysts resolve spontaneously, and so initial expectant management can be done,[6,7] with resolution rates varying from about 8–85% in some series.[10] Spontaneous resolution of a pseudocyst is more frequent in children than in adults.[6] Spontaneous resolution may also occur if the cyst ruptures into the gastrointestinal tract forming a cyst-enteric fistula.[10] Persistent or chronic pseudocyst should be drained to improve symptoms and treat complications, and the traditional guidelines for drainage include pseudocyst that persists for >4–6 weeks and ≥6 cm in diameter.[7,10] Such a chronic cyst has a low likelihood of complete resolution and is associated with significant morbidity.[7] The waiting period is to allow for maturity of the cyst wall. Serial US or CT scan allows the surgeon to monitor the progress of the pseudocyst and determine the timing of drainage procedures.[10] Since most of our patients presented with symptomatic and matured cysts, this waiting period did not apply and therefore internal drainage was carried out after patient stabilization.

Open surgical internal drainage (cystogastrostomy and cystoduodenostomy) was the mainstay of treatment in our center. No recurrence was recorded in any of our patients, and none died. Recurrence rates of about 6%

**Table 1. The clinical features of pancreatic pseudocysts in 10 patients**

| Serial Number | Age (Years) | Sex | Duration of Symptoms (Days) | Symptoms | Etiology | Size of Cyst on US (cm) | Volume (ml) |
|---|---|---|---|---|---|---|---|
| 1. | 7 | F | 90 | Epigastric pain, fever, abdominal mass | Nil | 8.4x1 | 1,200 |
| 2. | 19 | F | 180 | Epigastric pain, fever, vomiting | Nil | 6.4x7.4 | 500 |
| 3. | 6 | M | 30 | Fever, jaundice, abdominal mass, weight loss, anemia | Nil | 8.4x7.5 | 1,500 |
| 4. | 35 | M | 150 | Epigastric pain, fever, vomiting, mass | Nil | 7.4x10 | 1,500 |
| 5. | 35 | M | 180 | Pain, fever, vomiting, mass | Trauma | 12.6x10 | 1,500 |
| 6. | 28 | F | 240 | Pain, fever, vomiting, anemia, mass, jaundice | Nil | 15.2x12.0 | 2,000 |
| 7. | 2 | F | 15 | Pain, vomiting, fever, constipation, mass, anemia | Nil | 6.4x4.4 | 700 |
| 8. | 8 | M | 30 | Pain, fever, vomiting, anemia | Trauma | 7.2x7.1 | 900 |
| 9. | 25 | M | 15 | Pain, vomiting, mass | Acute pancreatitis | 8.4x10 | 2,000 |
| 10. | 27 | M | 90 | Pain, fever vomiting, mass | Nil | 7.6x5.4 | 1,300 |

and mortality rates of <1% have been reported in one recent study.[3] Unsuccessful drainages are usually caused by large ductal leaks or disruption of the main pancreatic duct.[3] Significant advances in endoscopic and radiologic techniques have transformed the management of pancreatic pseudocyst. The newer techniques include laparoscopic approach; endoscopic ultrasound-guided cystogastrostomy or duodenostomy; and endoscopic retrograde cholangiopancreatography (ERCP)-guided transpapillary drainage, including the use of stents.[11-13] These diagnostic facilities are unavailable in our center. PCD using pig-tail catheter under US or CT scan guidance is an alternative option.[3,10] PCD is used in poor-risk patients who cannot withstand major surgery or when the cyst wall is not fully matured to take sutures, or in infected cysts.[3] Its drawbacks include external pancreatic fistula, infection, hemorrhage and damage to adjacent structures.[10]

Pseudocyst of the pancreas remains uncommon in Nigeria. Open surgical internal drainage is the mainstay of treatment in our environment, and it is safe and effective. However, in this era of minimally invasive surgery, the availability of the modern techniques in our center will improve the standard of management of pancreatic pseudocyst.

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