

Clinical Study and Management of Pseudocyst of Pancreas

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Abstract

Background and Objective: Pseudocyst is a common complication of pancreatitis. This study is to know the various etiologies and relative frequency of pseudocyst in relation to age and sex, establish an accurate diagnosis by relevant investigations, and to study the various modes of management such as conservative, percutaneous drainage, and surgery.

Patients and Methods: Thirty patients with signs and symptoms of pseudocyst of pancreas admitted in Department of General Surgery, Meenakshi Medical College Hospital and Research institute, Kanchipuram, during November 2018 to October 2020 were studied. Data related to the objectives of the study were collected. Collected data were analyzed by comparing with various standard studies.

Results: The majority of patients belonged to the age group of 31–50 years, which constituted 15 (50%) patients in the study. M: F = 5:1. Most common etiological factor was alcohol; most common mode of presentation was pain abdomen and tenderness. Incidence of palpable mass was in 80% of the patients studied, but with the usage of USG and CT-scan, pseudocyst was detected in all the cases. The results of internal drainage were excellent, which was done in 60% of the patients in our study. The post-operative complications include pain abdomen and wound infection seen in nine patients in our study.

Interpretation and Conclusion: (a) Pseudocyst is the most common complication of pancreatitis. (b) Early diagnosis with the aid of USG/CECT abdomen and timely management – internal drainage for mature cysts, external drainage for complicated cysts results in good prognosis.

Key words: CT scan, External drainage, Internal drainage, USG

INTRODUCTION

Acute pancreatitis usually characterized by the acute onset of symptoms in a previously healthy individual and the disappearance of those symptoms as the attack resolves; in contrast, patient with chronic pancreatitis may have prior attacks or symptoms of either exocrine or endocrine insufficiency before the current attack, and their symptoms may persist even after resolution of the current attack. Complications of pancreatitis, including peripancreatic effusions, acute pseudocyst, and pancreatic necrosis, are known been differentiated. The ability to study these lesions noninvasively at multiple points in times has allowed the

distinction between acute and chronic pseudocyst, two seemingly similar entities with quite different natural history and treatment requirements.

Aims and Objectives

The objectives of the study are as follows:

- To study various modes of clinical presentation (clinical profile) of patients with pseudocyst of pancreas admitted in Meenakshi Medical College Hospital and Research institute, Kanchipuram during the period- October 2018 to October 2020.
- To analyze the risk factors, clinical features, complications, and relative frequency of pseudocyst of the pancreas in relation to age and sex.
- To establish an accurate diagnosis by various investigative procedures such as USG abdomen, CECT abdomen, Barium meal, ERCP.
- To evaluate the changing trends and relative efficacy of various modes of management such as conservative, percutaneous drainage, and surgery.

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Inclusion Criteria

The following criteria were included in the study:

- a. Patients diagnosed as pseudocyst of pancreas with the help of clinical examination and diagnostic procedure such as USG abdomen, CECT Abdomen, Upper GI endoscopy, Barium meal, and ERCP.
- b. Admitted patients of both sexes and all age groups.

Exclusion Criteria

The following criteria were excluded from the study:

- a. All the true cysts of the pancreas.
- b. Neoplastic cystic swellings of the pancreas.
- c. Parasitic cysts (Hydatid cyst) of the pancreas.
- d. Congenital cysts of the pancreas.

PATIENTS AND METHODS

Source of Data

Data were collected from patients who presented with signs and symptoms of the pancreatic pseudocyst to Department of General Surgery, Meenakshi Medical College Hospital and Research institute, Kanchipuram for treatment.

Design of the Study

It was a prospective study.

The clinical study of 30 cases of pseudocyst of the pancreas was conducted by selecting patients presenting to Department of General Surgery, Meenakshi Medical College Hospital and Research institute, Kanchipuram, during a period of 2 years from November 2018 to October 2020.

Method of Collection of Data

All the patients with suspected pseudocyst of the pancreas were investigated, offered individualized treatment, and followed up. The institution where this study was conducted is equipped to carry out all necessary investigations, which helped in diagnosing and treating the cases. These include an ultrasound scan, computed tomography, upper gastrointestinal endoscopy (UGIE), ERCP, and barium meal, which was immensely helpful in arriving at the diagnosis of pseudocyst of the pancreas.

Plan for Data Analysis

The clinical outcomes were documented using a standard proforma. The collected data were analyzed by comparing them with various standard studies on the pseudocyst of the pancreas.

Mode of Selection

This study includes both adults and pediatric age group patients. Patients with a diagnosis of pancreatitis were admitted and monitored. If, during the course of their

illness, they developed symptoms suggestive of the pancreatic pseudocyst, ultrasonography of the abdomen was done, and if it confirms the presence of the pseudocyst, those patients were included in our study. Those patients only with acute or chronic pancreatic or peripancreatic fluid collection without evidence of encapsulation on USG or who refused operation were excluded from the study.

The diagnosis of pseudocyst was made in all patients by USG abdomen initially. In addition, a CECT scan of the abdomen was performed in all 30 patients to define the exact size, location, extent, and relation of the pseudocyst to adjacent viscera, cyst wall thickness (maturity), and to diagnose any complications. UGIE was performed in 25 patients to look for the indentation of the posterior wall of the stomach/duodenum caused by the pseudocyst and to plan the surgical approach accordingly. Barium meal was done in selected (five) patients to know the compression effect on adjacent organs – mainly the stomach.

Demographic data were collected, including the age and sex of the patient, as well as the etiology of pancreatitis. Every patient with a pseudocyst had serial USG studies to monitor the progression of the cystic collection. All patients with acute pseudocyst were managed conservatively by withholding oral intake, IV fluids, analgesics, and antibiotics as long as they had pain abdomen, vomiting, or ileus. They were then followed up if the cyst did not regress. Follow-up continued till the cyst wall is matured. All mature cysts were treated surgically. Data such as duration of hospital stay, conservative management, and its results and surgical procedure done and their results, complications if any, the progress of the pseudocyst on follow-up were carefully recorded.

OBSERVATIONS AND RESULTS

The results obtained in our study during the period–October 2018–October 2020 at Department of General Surgery, Meenakshi Medical College Hospital and Research institute, Kanchipuram, were analyzed as follows:

In our study of 30 patients, the age of patients was from 2 years to 65 years. Pseudocyst of the pancreas was common in the age group 31–50 years (50%) with a mean age of 37 years. This is probably due to alcohol use, which is common in this age group [Table 1].

In our study of 30 patients, there were 25 (83.3%) male patients and 5 (16.6%) female patients, indicating that the disease is more common in males with a male to female ratio of 5:1. This was due to a higher alcohol intake in males [Table 2].

Table 1: Age distribution

Age in years	No. of patients	Percentage
≤(%)	3	10
11–30	8	26.6
31–50	15	50
≥0.	4	13.3

Table 2: Sex distribution

Sex	No. of patients	Percentage
Male	25	83.3
Female	5	16.6

Table 3: Symptoms

Symptoms	No. of patients	Percentage
Abdominal pain	30	100.0
Nausea/vomiting	24	80.0
Abdominal distension	24	80.0
Anorexia/Weight loss	6	20
Fever	4	13.3
Jaundice	1	3.3
Hematemesis	1	3.3

Table 4: Signs

Signs	No. of patients	Percentage
Abdominal tenderness	30	100
Mass abdomen	24	80
Ascites	2	6.6
Ileus/intestinal obstruction	1	3.3

Table 5: Risk factors

Risk factors	No. of patients	Percentage
Alcohol	20	66.6
Idiopathic	5	16.6
Blunt trauma	4	13.3
Biliary disease	1	3.3

The most common symptom was upper abdominal pain, which was present in all patients (100%), followed by nausea/vomiting, which was present in 80% of the patients, and abdominal distension (mass) present in 80% of the patients [Table 3].

The most common sign was upper abdominal tenderness, which was present in all patients (100%), followed by mass per abdomen, which was present in 80% of the patients [Table 4].

The most common risk factor was alcohol, which was present in 66.6% of the patients, followed by idiopathic in 16.6%, blunt trauma was present in 13.3%, and biliary disease in one patient (3.33%) [Table 5].

Table 6: Associated complications

Complications	No. of patients	Percentage
Infection	4	13.3
Ascites	2	6.6
Gastric outlet obstruction	1	3.33
Biliary tract obstruction	1	3.33
Rupture	1	3.33
Hemorrhage	1	3.33

Table 7: Investigations

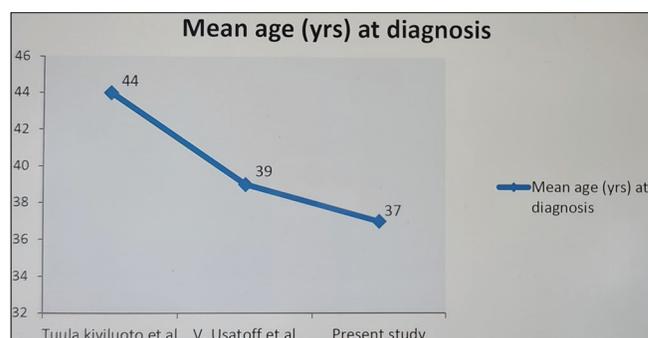
Investigation findings	No. of patients	Percentage
Increased Serum amylase	12	40
Increased Ascitic amylase	2	6.6
USG (+ve)	30	100
CECT scan (+ve)	30	100
Upper GI endoscopy	17	56.6
Barium meal	5	16.6
ERCP	2	6.6

Table 8: Treatment

Treatment	No. of patients	Percentage
Conservative	6	20.0
Percutaneous aspiration	1	3.33
External catheter drainage	5	16.66
Open Cystogastrostomy	12	40
Laparoscopic Cystogastrostomy	2	6.66
Cystojejunostomy	2	6.66
Cystoduodenostomy 1	1	3.33
Distal pancreatectomy + splenectomy	1	3.33

Table 9: Immediate post-operative complications

Complications	No. of cases	Percentage
Wound infection	4	13.3
Pain	5	16.66
Mortality	1	3.3

**Graph 1: Comparison of mean age at diagnosis with Kiviluoto *et al.*^[5] and Usatoff *et al.*^[2]**

Infection was the most common complication found in 13.3% of patients, followed by ascites (6.66%), one case each with gastric outlet obstruction, biliary obstruction/

jaundice, and ruptured pseudocyst (3.33% each), and there was one case of hemorrhage presenting as massive hematemesis (3.33%) [Table 6].

USG was the basic investigation done in all patients (100%). Contrast-enhanced CT scan (with oral and intravenous contrast) was performed in all 30 patients to assess the exact size, location, wall thickness, and relation of the pseudocyst to adjacent organs and also to look for associated complications and guide the appropriate modality of treatment. CECT scan also provided information about the status of the pancreatic parenchyma and pancreatic duct, that is, any evidence of pancreatic necrosis, main pancreatic duct dilatation or calculi, etc....

UGIE was done in 17 cases, and Barium meal was done in 5 (16.6%) of the patients with complaints suggestive of adjacent organ compression – mainly stomach. Two patients (6.6%) who needed an ERCP: One patient with jaundice due to extrinsic biliary compression by the pseudocyst underwent ERCP with endoscopic sphincterotomy and common bile duct stenting. Another patient with a ruptured pseudocyst and massive ascites was managed initially with external catheter drainage. An ERCP at a later date showed pancreatic duct disruption – a pancreatic duct stent was placed with subsequent resolution of ascites. Serum amylase was raised in 12 (40%) patients who presented with a picture of acute on chronic pancreatitis. Ascitic fluid amylase was done in 2 (6.6%) of the patients, and the result was positive [Table 7].

After thorough clinical evaluation and investigative workup, our 30 patients with pseudocyst of the pancreas were offered individualized treatment as follows.

Surgery was the mainstay of treatment in the majority of the patients-with cystogastrostomy being the most commonly performed procedure in 14 patients (46.66%) – 12 patients underwent open cystogastrostomy, and two patients with appropriately located pseudocysts in the lesser sac arising from the body of pancreas and indenting the posterior gastric wall were offered laparoscopic anterior trans-gastric cystogastrostomy (mean operating time = 110 min; mean hospital stay = 6 days). Conservative management was successful in 6 (20%) patients. External catheter drainage was needed in 5 (16.66%) patients, especially those with infected pseudocysts/ascitis, and in one patient who had ruptured pseudocyst with gross ascites. Percutaneous USG-guided aspiration sufficed in 1 (3.33%) patient with a small collection in the sub-hepatic pouch. The other surgical procedures performed were: Roux-en-Y Cystojejunostomy in 2 (6.66%) patients, cystoduodenostomy was done in 1 (3.33%) patient. One patient who presented with massive hematemesis and was found to have splenic artery

pseudoaneurysm with hemorrhagic pseudocyst in the tail of the pancreas underwent distal pancreatic-splenectomy. In all the surgical cases, the pseudocyst fluid was rich in amylase, and the cyst wall biopsy was negative for malignancy [Table 8].

Immediate post-operative pain was present in 16.66% of patients and wound infection in 13.3%. The total duration of hospital stay ranged from ten to 15 days. One patient with pancreatic tail pseudocyst with active bleeding splenic artery pseudoaneurysm who underwent splenic artery ligation and distal pancreatic splenectomy died in the immediate post-operative period (post-operative day 1) due to hemodynamic instability and shock.

Follow-up

The patients were followed up for a period of 3–6 months. Two patients developed recurrence but refused readmission/further treatment. Three cases were lost to follow-up [Table 9].

DISCUSSION

A pseudocyst is a well-circumscribed fluid collection with no associated necrosis of tissue that is present for four or more weeks after disease onset. The development of the pseudocyst requires disruption of the pancreatic duct, and this occurs in the context of acute pancreatitis (10–15% of cases), trauma, or duct obstruction in chronic pancreatitis (20–40% of cases).^[1,2] Most of the results of our study were compared with two standard studies by Kiviluoto *et al.*^[3] (1989) and Usatoff *et al.*^[4] (2000). Out of 30 cases, three were of the pediatric age group, and the rest 26 cases belonged to the adult group.

Sex Distribution

Out of 30 cases, 25 patients were male and five patients were female. This is compared with the study of Usatoff *et al.*^[4] (2000) and Kiviluoto *et al.*^[3] (1989). Alcohol is the most common risk factor for acute/chronic pancreatitis and the subsequent development of pseudocyst. In our study, the incidence of pseudocyst of pancreas predominated in males (25 Males Vs. five Females) with an M: F ratio of 5:1. This is because of the fact that alcohol consumption is more common in males compared to females. Our results are comparable with that of Kiviluoto *et al.*,^[3] where the M: F ratio was 4:1.

Age Distribution

In this study, the common age group was 31–50 years (50% cases) and was compared with a study group of Kiviluoto *et al.*^[3] (1989) and Usatoff *et al.*^[4] (2000).

These findings are probably due to the increased frequency of alcohol consumption in this age group (31–50 years).

Four patients were over the age of 51 years in our study. There were only three patients in the pediatric age group, the cause of pancreatitis/pseudocyst formation was blunt trauma abdomen in one child, and in the remaining two children, the reason was unknown/idiopathic. The mean age at diagnosis in this study was 37 years, which is comparable to the study by Usatoff *et al.*,^[4] in which the mean age at presentation of pseudocyst was 39 years [Graph 1].

Symptoms

In our study, the most common symptom patients presented with was pain abdomen and mass per abdomen. These symptoms were compared with the study group of Kiviluoto *et al.*^[3] (1989) and Usatoff *et al.*^[4] (2000). All 30 patients in our study group presented with pain abdomen, and 24 patients had a mass per abdomen (80%).

Risk Factors

The most common risk factor in our study was alcohol (66.6%). This is compared with the study group of Kiviluoto *et al.*^[3] In our study, alcohol was the commonest risk factor for the development of pseudocyst of the pancreas, especially in males.

Complications

Complications occur in about 10% of cases and the four main complications are infection, rupture or internal fistulation, bleeding, and mass effect.^[5] The most common complication in our study was an infection, followed by ascites. This is compared with the results of Usatoff *et al.*^[4] (2000).

Pseudocysts are initially sterile, but infection can occur in up to 25% of cases.^[5,6] Four patients in our study had infected pseudocysts and were managed by percutaneous/external catheter drainage with the widest possible drains placed under image (USG) guidance along with appropriate antibiotics and supportive care. The progress of the patients were assessed with repeated scans, and the drains needed to be flushed regularly. Two patients required repositioning/reinsertion of the drains. One patient presented acutely with massive, generalized, and enzyme-rich pancreatic ascites secondary to a ruptured pseudocyst. Paracentesis revealed turbid fluid with a high amylase level. Adequate drainage with wide bore drains placed under USG guidance was attempted. The patient received parenteral nutrition, and octreotide was administered to suppress pancreatic secretion.

An ERCP demonstrated duct disruption, and the patient underwent pancreatic duct stent placement with subsequent resolution of ascites. One patient in our study presented in the emergency setting with massive hematemesis and hemoglobin of 4.5 g%. The patient was resuscitated with

four units of blood transfusion, and a triple-phase contrast-enhanced CT scan of the abdomen was performed, which revealed a hemorrhagic pseudocyst in the tail of the pancreas with a splenic artery pseudoaneurysm.

The bleeding risk is increased in the presence of local infection. This situation carries high mortality (20%).^[7] On exploration, splenic artery pseudoaneurysm densely adherent to adjacent structures and associated with distal pancreatic necrosis was found. We performed a distal pancreatic-splenectomy with proximal ligation of the feeding vessel with necrosectomy. The patient went into irreversible hemorrhagic shock and succumbed to death on 1st post-operative day.

Recent data suggest that symptomatic and high-risk peripancreatic pseudoaneurysms should be promptly identified and treated. Nowadays, transcatheter embolization is also a good option with comparable results in stable patients.^[8]

Treatment

The most important factor dictating the mode of treatment is local expertise. 57 Treatment commonly performed in our study was internal drainage in 53.3%. This is compared with a study group of Kiviluoto *et al.*^[3] (1989) and Usatoff *et al.*^[4] (2000). Conservative management was done in 20% of the patients, and percutaneous aspiration in 3.3% of patients in our study group. About 16.6% of the cases in our study, especially those with infected pseudocysts/ascites, underwent external catheter drainage. A well-matched population-based study comparing percutaneous ($n = 8121$) with open surgical drainage ($n = 6409$) in 14,914 patients with pancreatic pseudocysts revealed a longer length of hospital stay and twice the mortality (5.9% vs. 2.8%) for the former.^[9] In our study, surgery was the mainstay of treatment in a majority of the patients – with cystogastrostomy being the most commonly performed procedure in 14 patients (46.66%) – 12 patients underwent open cystogastrostomy, and two patients with appropriately located pseudocysts were offered laparoscopic cystogastrostomy (mean operating time = 110 min; mean hospital stay = 6 days). The other surgical procedures performed were: Roux-en-Y Cystojejunostomy in 2 (6.66%) patients, cystoduodenostomy was done in 1 (3.33%) patient.

Post-operative Complications

In our study, the most common complication was persistent pain abdomen followed by wound infection in the immediate post-operative period. This is compared with the study group of Kiviluoto *et al.*^[5] (1989) and Usatoff *et al.*^[2] (2000). Immediate post-operative complications in our series include: Pain abdomen present in 16.6% of the patients and wound infection in 13.3% of the patients. The total duration of hospital stay in our study was 10–15 days.

Mortality

In our study, 1 patient (3.3%) with pancreatic tail pseudocyst and actively bleeding splenic artery pseudoaneurysm who underwent splenic artery ligation and distal pancreatic-splenectomy died in the immediate post-operative period (post-operative day 1) due to hemodynamic instability and shock.

Follow-up

In all surgical cases, the pseudocyst wall biopsy was negative for malignancy in our study. Most patients in our study were followed up to periods varying from 3 to 6 months. There were no complications except recurrence in two patients who refused admission. Three of the patients were lost to follow-up.

CONCLUSION

- The disease is most commonly seen in the age group 31–50 years, mostly in males
- The most common cause of pseudocyst is alcohol-induced, followed by idiopathic.
- The most common presentation is pain abdomen with abdominal tenderness and mass per abdomen.
- Ultrasonography was the most useful initial investigation for diagnosis and follow-up. CECT abdomen better delineated the size, location, and relation of the pseudocyst to adjacent viscera and was instrumental in the diagnosis of associated complications. Few patients required UGI endoscopy, ERCP, Barium meal, etc.
- Acute pseudocysts were treated conservatively; infected cysts and ruptured cyst required external drainage. Percutaneous aspiration resulted in recurrence in our case.
- Anastomoses of pseudocyst to the nearby bowel, either cystogastrostomy or cystojejunostomy, was done in the majority of the cases with good results.
- Laparoscopic surgery for internal drainage of pseudocyst of the pancreas is a safe procedure and

offers all the benefits of minimally invasive surgery, but needs expert skills.

- Endoscopic drainage of pseudocysts could not be performed in our study setup due to a lack of necessary equipment and expertise.
- The most common post-operative complications were – wound infection and pain abdomen.
- Mortality was seen in – 1 case (3.3%) – with splenic artery pseudoaneurysm and hemorrhage into pseudocyst who died due to severe hemodynamic compromise.
- The total duration of hospital stay ranged from 10–15 days
- Follow-up was done for 3–6 months; three cases were lost to follow-up. Recurrence was seen in two cases, who refused admission.

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