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Pseudocyst of Pancreas: A Clinical Study

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Abstract:
Introduction:*Pancreatic pseudocysts belong to a large and heterogeneous group of cystic pancreatic lesions and represent a complication of acute or chronic pancreatitis. The objective of this observational study was to study the different etiologies, clinical features, investigations and management of pseudocyst of pancrease in patients being treated at KMC hospital Manipal.*
Methodology:*A prospective observational study was carried out on patients diagnosed with a pancreatic pseudocyst in the Department of Surgery/Medicine/Gastroenterology in Kasturba hospital, Manipal. The study was conducted over a period of 2 years from 1st September 2012 to 31st August 2014. A total of 50 patients were included in the study.*
Results:*The majority of patients belonged to the age group of 30-39 yrs(40%) and showed a predisposition towards males (96%). Abdominal pain was the presenting symptom (98%) and abdominal tenderness was present in 62% of patients. Majority of the patients had history of alcohol abuse (47%). CECT abdomen was more useful for details of pseudocyst. The mean size of pseudocyst was 9.62 cms. Most common site for pseudocyst was body and tail (24%). The major complication seen was hemorrhage in cyst (8%).The most commonly done procedure was cystogastrostomy (18%).*
Conclusion: *Surgery is the traditional modality for treating pancreatic pseudocysts, with high success rates and low morbidity and mortality, and it still plays an important role in therapy. Laparoscopic management has been reported with very encouraging results, but long-term follow-up has still to show equivalence to open surgery. Endoscopic therapy is a reasonable alternative to surgery, particularly for chronic pseudocysts, and is increasingly being used.*
Keywords*: Alcohol abuse, Cystogastrostomy, Cystic neoplasm of pancrease, Pancreatitis, Pancreatic pseudocyst.*

I. Introduction

A pseudocyst presents as a cystic cavity connected to the pancreatic duct system, either directly or via the pancreatic inflammatory tissue. Pancreatic pseudocysts may occur as a consequence of both acute and chronic pancreatitis. It contains a collection of pancreatic juice, usually sterile, is rich in pancreatic enzymes, and enclosed by a well-defined non-epithelialized wall of fibrous or granulation tissue.

Pancreatic pseudocysts are caused by pancreatic ductal disruption following increased pancreatic ductal pressure, either due to stenosis, protein plugs or calculi obstructing the main pancreatic ductal system, or as a consequence of pancreatic necrosis following an attack of acute pancreatitis[1, 2].Formation of a pancreatic pseudocyst requires four or more weeks from the onset of acute pancreatitis. Acute fluid collections are not surrounded by a wall, andoccur early after acute pancreatitis.

Classification of pancreatic pseudocysts based on the underlying aetiology of pancreatitis (acute or chronic) and the ductal anatomy, and the presence of communication between the cyst and the pancreatic duct, was published in 1991 and is still valid [3].

The pseudocyst size ranges from very small to more than 25 cm in diameter[4, 5].Most commonly only one pseudocyst is present after acute pancreatitis. The symptoms depend on the size and location of the pseudocyst and may include pain, nausea and vomiting. Less frequent are gastric outlet and/or bile duct obstruction, bleeding andrupture [6]. Occasionally, the pseudocyst is palpable.

Pancreatic pseudocysts are diagnosed in 10-15% of patients after acute pancreatitis [7,8]. Even if no comprehensive cohort study has been conducted to evaluate the true incidence of pseudocysts, it is approximated to be 0.5-1 per 100 000 adults annually [9].

The occurrence of pseudocyst parallels that of pancreatitis and the etiology of pseudocysts resembles the causes of pancreatitis closely, and it is more common after alcohol-induced than after non-alcohol-related pancreatitis. Alcohol-related pancreatitis appears to be the major cause in studies from countries where alcohol consumption is high and accounts for 59%-78% of all pseudocysts [10].

Sensitivity rates for USG in the detection of pancreatic pseudocysts are 75% to 90%. Therefore, USG is inferior to CT, which has a sensitivity of 90% to 100%. USG has several limitations and examinations are highly operator dependent [10].In addition, CT scans provide more detailed information regarding the

surrounding anatomy and can demonstrate additional pathology, including pancreatic duct dilatation and calcifications, common bile duct dilatation, and extension of the pseudocyst outside the lesser sac.

MRI is generally not routinely used. However, the pancreatic duct and biliary systems are easily visualized in detail, although interpreting the status of pancreatic duct integrity may be difficult[11].EUS is usually used as a secondary test to further evaluate pancreatic cyst detected by other imaging modality (USG, CT or MRI). Cyst fluid aspiration can be done for analysis.

Percutaneous drainage, endoscopic drainage and surgery are the available treatment strategies[12]. Treatment forpseudocyst includes Conservative treatment, meaning "observation", based on the knowledge that spontaneous resolution can occur [13]. It is suitable in patients without symptoms, with unaltered or diminishing pseudocyst size. Percutaneous puncture with USG or CT guidance can give instant pain relief and the possibility to fluid bacterial culture, but the recurrence rate is high.

Endoscopic transpapillary drainage with ERCP is suitable in pseudocystsdue to chronic pancreatitis, which communicate with the ductal system [14]. The potential complications are severe bleeding and perforation [15]. Endoscopic treatment has been shown to be as equally effective as open surgery [16]. Even if the trend is towards primary minimally invasive treatment, open surgery with internal drainage to the gastrointestinal tract is a well-established and safe choice with good results, but also associated with significant morbidity and mortality in some cases [17,18].The complications of pancreatic pseudocyst include splenic complications, rupture, hemorrhage, infection, biliary complications and portal hypertension.

The present study was carried out to evaluate the various etiologies, clinical presentations, investigative procedures, treatment modalities and complications of pseudocyst of pancreas.

II. Methodology

A prospective observational study was carried out on patients diagnosed with a pancreatic pseudocyst in the Department of Surgery/Medicine/Gastroenterology in Kasturba hospital, Manipal. The study was conducted over a period of 2 years from 1st September 2012 to 31st August 2014. A total of 50 patients were included in the study.All patients >16 yrs of age admitted in Kasturba hospital, Manipal, diagnosed as pancreatic pseudocyst were included in the study. Patients < 16yrs and with other cystic lesions of pancreas, viz., cystic neoplasm of pancreas, etc. were excluded.Patients presenting with pancreatic pseudocysts were clinically examined and subjected to a proforma in accordance with the inclusion and exclusion criteria of the study.The results obtained were statistically analyzed using SPSS 21.0 software.

III. Results

The present study which was conducted on a group of 50 patients, revealed the following observations. These cases were all either hithero untreated cases or those referred from a primary or a secondary centre for tertiary care, owing to complications, at Kasturba Hospital, Manipal.

The majority of patients belonged to the age group of 30-39 years which accounted for 40% of the total number of patients.The mean age was 38.52 years with standard deviation of 11.213 yrs.The sex distribution in this study showed a predisposition towards males, 48 patients (96%), as compared to females 2 patients (4%).

Abdominal pain was the presenting symptom in 49(98%) in majority of patients. Radiation to the back was seen in 30(60%). Diarrhea and breathlessness were seen in least of the cases i.e in 2(4%) cases. Abdominal tenderness was present in 31 (62%) of patients. A palpable mass was present in 23 (46%). 6 (12%) patients had ascites on examination.

37 (74%) patients had history of alcohol abuse. Biliary disease was present in 9 (18%) patients. 2 patients had history of laparoscopic cholecystectomy. 1 (2%) patient had hypertriglyceridemia as a cause on evaluation (Table 1).

21 (42%) patients had acute pancreatitis, and 29 (58%) patients had chronic pancreatitis. Leucocytosis was found in 16 (32%) patients. 7 (14%) patients had hemoglobin less than 10 gm/dl. 10 (20%) patients were diabetic. Direct bilirubin was raised in 7 (14%) patients. Serum ALP was elevated in 12 (24%) patients. Serum amylase was elevated in 36 (72%) patients. 32 (64%) patients had raised serum lipase.

Chest X-ray showedpleural effusion in 11 (22%) patients. Ultrasonography was performed in 37 (74%) patients, of which pseudocyst was not clearly visualized in 2 cases and became evident on CECT abdomen. USG abdomen was very useful in visualizing pancreatic duct and biliary tree abnormality.CECT abdomen was done in 39 (78%) patients, and was useful for details of pseudocyst viz., site, size, adjacent organs, presence of hemorrhage, etc.

The mean size of pseudocyst was 9.62 cms. The standard deviation was 4.499 cms. The smallest pseudocyst was 1.9 cms. The largest was 20 cms.Most common site for pseudocyst was body and tail, 12 (24%) patients and least common was uncinate process, 1 (2%) patients.13 (23%) patients had multiple pseudocysts.

5 (10%) patients had gall stones. 1 (2%) had CBD dilatation. Pancreatic duct calculi were found in 3 (6%) patients and 13 (26%) patients showed pancreatic duct dilatation.4(8%) of the cases presented with the complication of hemorrhage in cyst. Pancreato-pleural fistula was seen in 3(6%) of the patients (Table 2).
15 (30%) patients were managed conservatively as most of them had lesion less than 6 cms in diameter and did not have a mature cyst wall. These patients were followed up regularly. 7 (14%) patients underwent percutaneous USG guided aspiration. ERCP and pancreatic duct stenting was done in 7(14%) patients. 6 (12%) patients underwent EUS guided cystogastrostomy. 15 patients were treated surgically. Most commonly done procedure was cystogastrostomy, in 9 (18%) patients. 3 (6%) patients underwent roux-en-y cystojejunostomy and external drainage was done in another 3 (6%) patients. 1 patient underwent laparoscopic cystogastrostomy with cholecystectomy. Cystogastrostomy with cystojejunostomy was done in same setting in 1 patient (Table 3).

The cases were followed up for 6 months.In the conservative group, of the 15 patients, 9 patients had on and off recurrent abdominal pain. In 3 patients the cyst had disappeared. The cyst had increased in 3 of the patients. All were managed conservatively. Among the 7 patients who underwent USG guided aspiration, complete resolution was seen in 1 patient. In 5 out of 7 patients treated by ERCP and pancreatic duct stenting, complete resolution was achieved. EUS guided cystogastrostomy was done in 6 patients out of which in 5 patients cyst had disappeared. Cystogastrostomy was done in 9 patients, of which, 4 showed complete resolution. In all the 3 cases treated by roux-en-y cystojejunostomy, cyst disappeared completely. 2 of 3 cases who underwent external drainage showed complete resolution (Table 4).

Thepost operative complications include infection of residual cavity which was seen in1 patient developed and was managed conservatively. Patient improved on conservative management. The post procedural complication included infection of residual cavity following ERCP and pancreatic duct stenting in 1 patient and was managed by pigtail drainage. The patient expired due to bleeding.1 patient developed bleeding in residual cavity, post EUS guided cystogastrostomy and was managed with blood transfusions.In the study, out of 50 patients, 2 were lost on follow up (they were on conservative management). 2 patients had discharged themselves against medical advice (1 had USG guided drainage and other was on conservative management). 2 patients died due to pseudoaneurysmal bleed (had USG guided drainage).

IV. Tables

Table 1: Etiology

Etiology	Frequency	Percent
Alcoholism only	34	68%
Gallstones disease only	6	12%
Both gall stones and alcoholism	3	6%
Hypertriglyceridemia	1	2%
Idiopathic	6	12%
TOTAL	50	100%

Table 2: Complications

	Frequency	**Percent**
Hemorrhage in cyst	4	8%
Pancreato-pleural fistula	3	6%
Rupture in peritoneal cavity	2	4%
Pseudoaneurysmal bleed	2	4%
Pancreato-gastric fistula	1	2%
Infection of cyst	1	2%
TOTAL	13	26%

Table 3: Management

Management modality	**Frequency**	**Percent**
Conservative	15	30
USG guided pigtail drainage	7	14%
ERCP and pancreatic duct stenting	7	14%
EUS guided cystogastrostomy	6	12%
Surgical cystogastrostomy	9	18%
Surgical roux-en-y cystojejunostomy	3	6%
Surgical external drainage	3	6%
Total	50	100%

Table 4: 6 Month Follow Up

	Cyst Decreased	Cyst Disappeared	Cyst Increased	No Change	Not Done	Total
Conservative	5	3	3	1	3	**15**
USG Guided Pigtail Drainage	2	1	1	0	3	**7**
Ercp And Pancreatic Duct Stenting	2	5	0	0	0	**7**
Eus Guided Cystogastrostomy	1	5	0	0	0	**6**
Surgical Cystogastrostomy	2	4	1	0	2	**9**
Surgical Roux-En-Y Cystojejunostomy	0	3	0	0	0	**3**
Surgical External Drainage	1	2	0	0	0	**3**
Total	**13**	**23**	**5**	**1**	**8**	**50**

V. Discussion

In most of the series,Bodker et al., 1980 [19], Bodil Anderson, 2010, pseudocysts were seenin 4th and 5th decades, and the mean age was around 40-47 yrs. In our present series, majority of patients belonged to the age group of 30-40 yrs and the mean age was 38.52 yrs.

As compared to other studiesBodil Anderson, 2010, Varadarajulu et al., 2013[20], marked male predominance was seen in our study, in the ratio of 24:1 (male:female) and may be attributed to the fact that alcoholism is less common in females in India.

Abdominal pain is a consistent finding and is usually located in the epigastrium and upper abdominal quadrants often associated with radiation to back. Frequently patients present with mass abdomen or sometimes with nausea, vomiting, anorexia, jaundice. Weight loss is a common feature but is more marked in neoplastic cysts [21]. In our present study also pain abdomen was the commonest complaint being present in 98%, with radiation to back in 60%. Other symptoms like vomiting, anorexia, weight loss were also present in a significant number of patients.Physical examination in our study revealed abdominal tenderness in 62% of patients and a palpable mass in 46% of patients. Fever, ascites and jaundice were present in some patients. In many other series, tenderness was not a very common clinical finding, whereas a palpable mass was reported in 75% of cases [21].

Various western countries revealed alcoholism as the commonest cause of pancreatits leading to pseudocyst formation (65-80%), by biliary tract disease in about (6-20%) cases and trauma as the cause in (3-10%). Others were classified as idiopathic cases (6-20%)[20, 22, 23, 24].Our present study shows alcohol intake as the commonest etiology (68%)

Amylase and lipase levels are often elevated, but may be within reference ranges. Some laboratory tests may provide clues to the underlying etiology of pancreatitis (e.g. elevated triglycerides or calcium level). Elevated liver chemistries raise the suspicion for biliary pancreatitis [12].In our present study, serum amylase was raised in 72% patients with 8% of patients having serum amylase more than 1000 u/l. Serum lipase was elevated in 64% of patients.Leucocytosis was present in 32% patients. Hemoglobin of less than 10gm/dl was found in 14% patients. Raised direct bilirubin was seen in 14% patients and raised serum alkaline phosphatase was seen in 24% patients.20% cases were diabetic, signifying pancreatic destruction.

Radiological studies are extremely helpful in making the diagnosis. Chest x-ray may show the evidence of pleural effusion. Our study revealed pleural effusion in 22% of patients.In our study, Ultrasonography was performed in 37 (74%) patients and CECT abdomen was done in 39 (78%) patients.

In a series at John Hopkins and Mayo Clinic, infection of the pseudocyst was reported in 4% and 1% respectively [8]. In our study infection of the pseudocyst was seen in 2% cases.Rupture of the pseudocyst may be seen as a surgical emergency with severe acute abdominal pain. It occurs in less than 3% of cases[25]. In our study, rupture with peritonitis was seen in 4% cases.

Several studies have indicated that the size of the cyst and the length of time the cyst has been present are poor predictors of potential for pseudocyst resolution or complications, but in general, larger cysts are more likely to become symptomatic or cause complications[26]. However, some patients with larger collections do well; therefore, size of the pseudocyst alone is not an indication for drainage [13, 27]. The two main indications for invasive intervention are the presence of symptoms or the presence of complications (infection, bleeding, gastric outlet or biliary obstruction).

In our study, conservative management was done for 15 patients with spontaneous regression in 3 patients (20%). The largest pseudocyst which disappeared after conservative management in the study was of 12.7 cms.

The reported long-term success rate for pseudocyst resolution for USG-guided pseudocyst drainage is around 50%. Unsuccessful drainages are usually caused by large ductal leaks or obstruction of the main pancreatic duct[26]. In a small series, the EUS approach has resulted in a success rate of more than 90% in patients with chronic pseudocysts[27]. The recurrence rate after endoscopic drainage is low, 4%, and the complication rate is less than 16% [26].In our study, 77% of patients undergoing EUS guided drainage (83.3%) or ERCP and pancreatic stenting (71.4%) had complete resolution.

A significantly higher mortality rate is associated with surgical therapy (9%) [12]In our study, there was no mortality associated with surgical therapy. 58.33% patients showed complete resolution (44.44% of patients undergoing cystogastrostomy and 100% of patients undergoing roux-en-y cystojejunostomy).

VI. Conclusions

The most common age group in which pseudocysts of pancreas occur is 4^{th} and 5^{th} decades with marked male predominance. Alcohol abuse is the most common etiological factor for pseudocystformation.Abdominal pain is the most common presenting complaint and is usually physical examination usually reveals abdominal tenderness and/or a palpable mass, most commonly in epigastrium.Amylase and lipase levels are often elevated, but may be within reference ranges.

USG has several limitations, as compared with CT, in the initial diagnosis of a pseudocyst, but is still the most commonly used procedure as it is relatively more feasible and cheaper.Endoscopic retrograde cholangiopancreatography (ERCP) is quite accurate in identifying pseudocysts and pancreatic ductal anomalies and can be used for therapeutic purposes also.

Surgery is the traditional modality for treating pancreatic pseudocysts, with high success rates and low morbidity and mortality, and it still plays an important role in therapy. Laparoscopic management has been reported with very encouraging results, but long-term follow-up has still to show equivalence to open surgery. Endoscopic therapy is a reasonable alternative to surgery, particularly for chronic pseudocysts, and is increasingly being used.

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