

STUDY OF RELATION OF ETIOLOGY AND COMPLICATIONS OF PSEUDOCYST OF PANCREAS

N. Krishna Mohan¹, K. Gayathri Reddy², M. K. Raufuddin³

¹Associate Professor, Department of General Surgery, Gandhi Medical College & Hospital, Secunderabad.

²Final Year Post Graduate, Department of General Surgery, Gandhi Medical College & Hospital, Secunderabad.

³Final Year Post Graduate, Department of General Surgery, Gandhi Medical College & Hospital, Secunderabad.

ABSTRACT: Pancreatic pseudocysts constitute in 5-15% of patients who have peripancreatic fluid collections after acute pancreatitis. By definition, the capsule of a pseudocyst is composed of collagen and granulation tissue and it is not lined by epithelium. The fibrotic reaction typically requires at least 4-8 weeks to develop. Most common causes are gall stones, alcohol, metabolic disorders, etc. 50 % cases will be symptomatic. Spontaneous regression is seen in up to 70% of cases. Complications of pseudocyst include infection, rupture of cyst causing pancreatic ascites and pancreaticopleural fistula and haemorrhage into the cyst.

AIM: To evaluate any correlation between different types of etiology and complications arising in pseudocyst of pancreas.

MATERIALS AND METHODS: It is prospective study conducted over a period of 2 years from 1st January 2012 to 31st December 2014. The study included 40 patients treated in a tertiary care hospital. Detailed histories were taken, thorough clinical examinations done and patients were subjected to available diagnostic modalities. They were treated with conservative management, external drainage and internal drainage depending on the presentation. Follow up for a period of 6 months to 1 year was done after the treatment to check for recurrence and development of complications. Relation between the etiology and complications of pseudocyst were studied.

RESULTS: In 67.5% cases alcohol was the etiological factor, 27.5% cases were due to gall stones. Complications were seen in 30% cases of which infection is the most common. Complications were seen irrespective of etiology.

CONCLUSION: Complications in pseudocyst of pancreas occur irrespective of its etiology.

KEYWORDS: Pseudocyst, Alcohol, Gall stones, Complications, Infection, Obstructive jaundice, Internal drainage, External Drainage, Laproscopic drainage.

HOW TO CITE THIS ARTICLE: N. Krishna Mohan, K. Gayathri Reddy, M. K. Raufuddin. "Study of Relation of Etiology and Complications of Pseudocyst of Pancreas". Journal of Evidence based Medicine and Healthcare; Volume 2, Issue 46, November 09, 2015; Page: 8266-8275, DOI: 10.18410/jebmh/2015/1116

INTRODUCTION: Pancreatic pseudocysts are the most common cystic lesions of the pancreas. They are localized collections of pancreatic juice occurring from disruption of intra pancreatic ductal system as a result of pancreatic inflammation, trauma or proximal duct obstruction. The extravasation causes an inflammatory response and a cystic wall composed of fibrous and granulation tissue develops a defined or mature pseudocyst over several weeks. Thus the wall of pseudocyst is distinguished from the types of pancreatic cyst by its lack of epithelial lining. Pseudocyst which arise in association with an acute episode of pancreatic inflammation are termed as acute pseudocysts. It should be suspected in patients with acute pancreatitis whose symptoms fail to resolve within 7-10 days. Over 50% of patients with acute pancreatitis demonstrate fluid collections. An early fluid collection should not be considered as a true pseudocyst until it persists for at least 4 weeks.

In contrast, chronic pseudocyst arise in the setting of chronic pancreatitis generally without an identifiable antecedent of acute pancreatitis. They may be present with or without symptoms.

Etiological factors of pseudocyst include obstructive causes like gall stones, alcohol intoxication, trauma, endoscopic procedures, etc.

Pseudocysts forming after a blunt abdominal trauma are often diagnosed weeks later, so that they are likely to have a mature wall at diagnosis. In children more than 60% of pseudocysts results from blunt trauma. These cysts tend to be more mature and therefore don't resolve spontaneously.

Accurate diagnosis is possible with the help of USG, CT Scan, MRCP and ERCP, demonstrating details of the cyst as well as the duct status, which is helpful in deciding future management. Around 20-40% asymptomatic pseudocysts resolve spontaneously where as others require some form of intervention due to large size of the cyst and its complications.

Complications mostly include infection, obstruction due to compression on surrounding structures, bleeding into the cyst, rupture of the cyst into peritoneum or pleural space.

Traditional methods of surgical approach to management of pseudocyst are now being challenged by endoscopic techniques and interventional radiology.

Submission 28-10-2015, Peer Review 29-10-2015,

Acceptance 30-10-2015, Published 09-11-2015.

Corresponding Author:

N. Krishna Mohan,

H. No. 3-5-867, Hyderguda,

Hyderabad-500029.

E-mail: krishnamohannaribole@yahoo.co.in

DOI: 10.18410/jebmh/2015/1116

In the light of these developments the options available are reviewed and strategies for management of pancreatic pseudocyst are suggested.

AIMS AND OBJECTIVES: To evaluate any correlation between different types of etiology and complications arising in pseudocyst of pancreas.

A chronic collection of pancreatic fluid surround by a non-epithelised wall of granulation tissue and fibrosis is referred to as a Pseudocyst.

Pseudocyst occurs in up to 10% of patients with acute pancreatitis and in 20-38% of patients with chronic pancreatitis and thus, they comprise the most common complication of pancreatitis.^{1,2,3} Pseudocysts are multiple in 17% of patients or may be multi-lobulated. They may occur intrapancreatically or extend beyond region of pancreas into other cavities or compartments.

MATERIALS AND METHODS:

Patient Selection: Cohort selected for this prospective study included 40 patients treated in a tertiary hospital between 1st January 2012 to 31st December 2014 with the available diagnostic modalities. Detailed histories were taken with thorough clinical examinations and the patients were subjected to various tests as per the requirement of the patients and cost considerations. those patients with acute pancreatic fluid collections lacking a well organized wall of granulation tissue.

Data Collection: Complete history with following points taken into consideration: (1) H/O Alcohol intake, gallstones, trauma, endoscopic procedures (ERCP) (2) Pain in abdomen (3) Abdominal lump (4) H/O fever, jaundice (5) H/O nausea, vomiting, weight loss (6) H/O recurrent symptoms s/o chronic pancreatitis.

On Examination:

General: For fever, tachycardia, BP, pallor, icterus and signs of liver cell failure.

Abdominal Examination: Tenderness, lump, organomegaly and free fluid.

Systemic Examination: Respiratory, CVS and CNS.

Investigations: (a) Complete haemogram (b) Liver function tests (c) Blood sugar level (d) Sr.creatinine, sr.electrolytes (e) Sr.amylase, sr.lipase values.

ECG and X-Ray Chest: Done for fitness for surgery and any other incidental findings.

USG Abdomen: Done for primary diagnosis, site and size of cyst, thickness of wall, septations, presence of gall stones and fluid in abdomen. In those patients who were asymptomatic, pseudocyst was detected on USG done for routine follow-up in patients with pancreatitis.

Repeat Ultrasonography was done during follow up of the patients for a period of 6 months to look for complications or recurrence.

CT Scan Abdomen: Done to add more value to information obtained on sonography with regards to site and size of cyst, its thickness, content of the cyst, unilocular or multilocular, pancreatic duct dilatation, relationship to adjacent viscera to decide further line of management.

MRCP: Done in those patients with pancreatic duct dilatation with possible communication of cyst on CT scan. Also those patients with evidence of obstructive jaundice were subjected to MRCP to look for CBD stricture or calculi, and those selected for percutaneous drainage to rule out duct –cyst communication

TREATMENT: The line of management was decided taking into consideration various factors.

CONSERVATIVE MANAGEMENT: Given to all asymptomatic pseudocysts those were picked up on routine follow up ultrasonography in case of acute pancreatitis. These patients were followed up by regular clinical examination and USG and were intervened if they became symptomatic or developed complications like infection and abscess, obstruction, obstructive jaundice, rupture of pseudocyst.

INTERNAL DRAINAGE: Surgical internal drainage like cystogastrostomy or cystojejunostomy was offered to those patients with uncomplicated symptomatic pseudocyst with close proximity to adjoining viscera and mature cyst wall confirmed by CT scan. Transhepatic endoscopic drainage was performed when endoscopically cyst showed compression over posterior wall of stomach. Transpapillary drainage was performed in those cysts showing communication with a dilated pancreatic duct on MRCP.

EXTERNAL DRAINAGE: External drainage was offered to those patients with abscess formation in a pseudocyst. Those who were fit for surgery and low risk offered surgical drainage and those who were unfit and high risk underwent percutaneous drainage.

FOLLOW UP: The patients were followed up for a period of 6 months to 1 year with clinical examination and usg to look out for resolution in case of conservative management and for recurrence in those who underwent either of the treatment modalities.

OBSERVATIONS AND RESULTS: Total number of 40 patients were studied in tertiary care hospital with all diagnostic and therapeutic modalities available.

A. INCIDENCE OF AGE AND SEX: In our study there was a male predominance in the group of 41-50 yrs of age.

Age incidence varied from 24 to 68 yrs with a mean age of 43.75 yrs.

Maximum no of patients were in age group of 41-50 years.

Out of 40 patients 31 were male i.e. 77.5% and 9 were female i.e. 22.5%. Male: Female ratio was 3.4:1.

B. CLINICAL PRESENTATION:

C. BIOCHEMICAL INVESTIGATIONS:

- 1. Hb(Normal 13-17 g/dl):** Ten out of 40 patients showed Hb <13g/dl i.e. 25%
- 2. WBC count(normal 4000-10000mm³):** 14 out of 40 patients showed WBC >10000/mm³ i.e. 35%. Of these, 8 patients with abscess had WBC count above 16000/mm³.
- 3. Random blood sugar (normal <180mg/dl):** Random blood sugar was found raised in 13 patients i.e. 32.5%
- 4. Total bilirubin (normal 0-1mg/dl):** 14 patients showed total bilirubin higher than normal range i.e. 35%. Of these, 5 patients with clinical jaundice showed marked increase in total bilirubin with raised direct component.
- 5. Total Proteins (normal 6.4-8.2 gm/dl):** 8 patients showed total protein < 6.4gm/dl (20%)
- 6. Alkaline phosphatase (normal 50-136 mu/ml):** 10 patients showed alkaline phosphatase higher than normal range i.e.25%. Of these 5 patients with jaundice showed marked rise in values of alkaline phosphatase
- 7. SGOT (Normal =15-37 mu/ml):** 11 patients showed raised SGOT i.e. 27.5%
- 8. SGPT (Normal: 30-65mu/ml):** 13 patients showed raised SGPT that 32.5%.
- 9.** Out of 40 patients, 31 had past h/o acute pancreatitis suggested by markedly raised Amylase and Lipase values i.e. 77.5%.

D. RADIOLOGICAL INVESTIGATIONS:

- 1. Abdominal Ultrasonography:** Ultrasonography was performed on all 40 patients as a part of follow up or due to presence of symptoms and signs. Of these, 38 patients with pancreatic pseudocyst were picked up on USG. Rest 2 being symptomatic underwent further imaging i.e.CT Scan
- 2. Computerised Tomography Scan:** Thirty – three patients underwent CT Scan. These did not include those 7 asymptomatic patients who were followed up on USG as a part of conservative management and resolved, so these didn't require CT scan.
- 3. Magnetic resonance Cholangiography:** Three patients of chronic pancreatitis with dilated pancreatic duct and pseudocyst in close proximity to duct underwent MRCP to confirm communication between pseudocyst and duct so as to undertake transpapillary drainage. Five

patients having obstructive jaundice on biochemical tests were subjected to MRCP to look for CBD stricture or calculi. Four patients who were selected for percutaneous drainage underwent MRCP to rule out duct cyst communication.

- 4. Upper GI Endoscopy:** Four patients underwent upper GI Endoscopy including those who presented with symptoms of obstruction. Of those, Scope could not be negotiated beyond pylorus in 1 patient and 3 patients showed extrinsic compression over posterior wall of stomach.
- 5. Endoscopic Retrograde Cholangiopancreaticography:** Three patients underwent ERCP including 6 who underwent endoscopic drainage of pseudocyst (transgastric and transpapillary). Three of them showed dilated pancreatic duct and presence of stricture in 1 patient along with communication with the pseudocyst. Two patients with jaundice showed CBD stricture which was stented.

Three patients with obstruction presented with early satiety, bloating of abdomen after meals and delayed transit of contrast on CT Scan.

TREATMENT:

- 1. Conservative Management:** Twelve out of 40 patients with pancreatic pseudocyst were asymptomatic and were detected on ultrasonography on routine follow up after a period of 4 weeks. These 12 patients were given a trial of conservative management. Of these, 4 patients responded with complete resolution over 8-12 weeks. 3 more patients were followed up over a period of 6 months to 1 year pseudocyst that remained stable or decreased in size with no complication. So, 7 patients respond to conservative management. Of the remaining 5 patients, 3 patients had increase in size of pseudocyst with pain and underwent cystogastrostomy for the same. 2 patients developed abscess and needed surgical drainage. Post-operative recovery was uneventful. So success rate was 58%.
- 2. Non-surgical management: Internal drainage:** Six out of 40 patients were managed nonsurgically by means of endoscopic drainage. Of these, 3 patients with chronic pancreatitis with dilated pancreatic duct and communication with pseudocyst underwent transpapillary stenting with complete resolution of pseudocyst. So success rate was 100%. Three patients with extrinsic compression over post wall of stomach on Upper GI scopy were chosen for transgastric drainage. Of these, one resolved completely with no recurrence. One patient showed persistent symptoms with residual collection and underwent cystogastrostomy for the same with complete resolution and no recurrence. The third patients cyst

initially regressed but again started increasing in size with pain, fever and leukocytosis suggestive of infection. The pseudocyst was drained externally surgically. He developed pancreatic fistula which did not resolve over next 6 weeks. So transpapillary stenting was done to compress the system. The pseudocyst completely resolved with no recurrence over subsequent follow up. So success rate was 33.33%.

3. Surgical Management: Internal drainage:

Thirteen out of 40 patients underwent internal drainage procedure. Of these, 12 patients underwent cystogastrostomy with pseudocyst wall in close relation to posterior wall of stomach on imaging. These included 2 patients with gall stone pancreatitis as etiology, who underwent cholecystectomy with cystogastrostomy as gall bladder was not removed when the patient had acute attack of pancreatitis. One patient who had pseudocyst in body and tail of pancreas not related to posterior wall stomach and was chosen for cystojejunostomy. All the 13 patients showed complete resolution with no recurrence.

4. External Drainage:

A. Surgical External Drainage: Five patients underwent surgical external drainage. These included 4 patients with abscess formation and one with peritonitis secondary to rupture of pseudocyst. Of these, 3 patients pseudocyst completely resolved. One patient developed an external fistula which resolved over next 6 weeks. One patient developed internal fistula (cystocolic) confirmed on dye study. Both patients were managed conservatively with no complaints on subsequent follow up. So success rate was 60%.

B. Percutaneous External Drainage: Four patients with abscess were selected for percutaneous external drainage as they were critically ill and were unfit for surgical drainage. Of these, 2 resolved and other 2 required external drainage for residual collection with resolution. So success rate was 50%.

DISCUSSION: Pseudocyst is one of the most common complication of acute and chronic pancreatitis accurate diagnosis is almost always possible by various imaging techniques including USG, CT Scan and MRCP. These not only confirm the diagnosis but provide valuable information in deciding the plan of management. In our study of 40 patients, 31 patients were pseudocysts following acute attack of pancreatitis and remaining 9 had chronic pancreatitis with recurrent pain.

A. AGE INCIDENCE: Age incidence varied from 24 to 68 years with a mean age of 43.75 yrs. Maximum no of patients were in the age group of 41-50 yrs.

B. SEX INCIDENCE: Our study showed male: female ratio of 3.4:1 [i.e. males (77.5%) and 9 females (22.5%).

Male incidence tends to be more because of more percentage of chronic alcoholics compared to females which is the commonest factor to cause pancreatitis and pseudocyst.

C. ETIOLOGICAL FACTORS: In our study, the commonest etiological factor was alcohol followed by gall stones. The result may be linked to higher percentage of population with alcohol intake coupled with poor nutritional intake. Others constitute minor group.

Other studies depicted show similar predisposition towards alcohol as compared to gall stones.

D. SIGNS AND SYMPTOMS: In our study the most common symptom was pain in abdomen (70%) followed by nausea and vomiting (52.5%). 45% presented with lump in abdomen.

Other studies show a similar picture.

E. BIOCHEMICAL INVESTIGATIONS:

- 25% of patients showed Hb below normal range. This may be due to loss of appetite in chronic alcoholics or nausea and vomiting with early satiety in these patients.
- 20% of patients showed leukocytosis $>16000/\text{mm}^3$ consistent with abscess formation in pseudocysts which was confirmed with cyst fluid culture.
- 32.5% patients had raised random blood sugar. These included 9 patients with known diabetes on treatment and rest 4 were confirmed for diabetes with fasting and postprandial blood sugar and were put on treatment for same.
- 12.5% patients showed marked increase in total bilirubin with raised direct component indicative of obstructive jaundice. These patients also showed significant increase in Sr. alkaline phosphatase confirming the obstructive nature of jaundice.
- SGOT was raised in 27.5% and SGPT was raised in 32.5% as compared to normal range. But these values were way below those that indicate significant liver cell damage.
- 77.5% of patients had raised amylase and lipase levels in their previous reports suggestive of acute attack of pancreatitis.

F. RADIOLOGICAL INVESTIGATIONS:

- 1. Abdominal Ultrasound:** All patients underwent abdominal ultrasound of which 38 patients were picked up on ultrasound i.e. 95% sensitivity with no false positives. Beebe et al⁶ in 1984 found USG to be 90% sensitive in detecting pseudocyst with false positivity of 5%. Pitchumoni et al¹² in 1999

found sensitivity of USG to be about 75-90%.USG has a limitation that it is not able to give detail relation of pseudocyst to adjacent viscera and presence of bowel gas obscures vision of the cyst.

2. **Computerized Tomography Scan:** Thirty-three patients underwent CT scan, not including those who were asymptomatic and followed up on USG and resolved. It was done not only to confirm diagnosis but also to define relationship to adjacent viscera to decide further line of management. It also gave a fair idea about dilated pancreatic duct and any duct calculi. Thirty four patients had unilocular cyst i.e.85% and 6 patients had multilocular cyst. Smallest cyst was 4x3 cms and largest cyst was 16*10cms in size.25% patients had pseudocyst in head.72.5 % had in body and 2.5% had in body and tail. Beebe et al⁶ found sensitivity of CT scan to be 92% with false positivity of 8%. As compared to USG, Pitchumoni et al¹² found CT scan sensitivity to be as high as 90-100%. Similarly McCain et al¹³ and Baron et al¹⁴ found USG to be less sensitive than CT scan since it is limited by body habitus, ascites and bowel gas overlying the pancreas.
3. **MRCP:** MRCP was done in total 12 patients. It was done in 3 patients with chronic pancreatitis with dilated duct to establish duct cyst communication, in all the patients of obstructive jaundice to look for CBD stricture or calculi and in 4 patients who were selected for percutaneous drainage. All the 3 patients showed definite duct cyst communication. 2 patients with jaundice showed CBD stricture and underwent ERCP and stenting of CBD. Those selected for percutaneous drainage showed nonstricture or duct-cyst communication. Vargese et al¹⁵ in 2002 found MRCP to be having 100% specificity, sensitivity and diagnostic accuracy for pancreatic pseudocyst, concluding that MRCP when interpreted in combination with USG and CT scan provides sufficient information to plan therapy in majority of patients.
4. **ERCP:** ERCP is found to be very useful as diagnostic as well as therapeutic modality. It helps to define ductal anatomy, communication of duct to pseudocyst as mentioned in D'Egidio and Schein classification¹⁶ to look for duct stricture, dilation and calcification and thus to decide further plan. Of the 8 patients who underwent ERCP, 3 showed definite duct cyst communication and were selected for transpapillary drainage. 2 patients who showed CBD stricture were stented and taken up for internal drainage. Nealon et al¹⁷ in 1989 conducted a prospective evaluation of routine preoperative ERCP in all patients schedule

for operative treatment of pseudocyst over 36 months period. ERCP was successful in 39 out of 41 patients who underwent ERCP. Of 41 patients, 18 patients showed duct cyst communication and 23 showed dilatation of MPD. Operative plan was altered by ERCP findings in 24 of 41 patients with no complications of ERCP, concluding that ERCP should be performed in all patients with pseudocyst to establish correct diagnosis and to allow optimal choice of operation.

5. **Upper GI endoscopy:** Four patients underwent upper GI endoscopy whose symptoms were suggestive of obstruction. 3 showed extrinsic compression and were selected for transgastric drainage thus helpful in making a non-surgical choice for management of pseudocyst. Aranha et al¹⁸ in 1984, reported 16 patients with gastric outlet and duodenal obstruction due to inflammatory pancreatic disease, of which 5 were due to pseudocyst and relieved by gastrojejunostomy in 3 and external drainage in 2 patients.

COMPLICATIONS: Most common complication in our study was infection and formation of an abscess in 20% of the patients, followed by jaundice in 12.5%, gastric outlet obstruction in 7.5% and rupture into the peritoneal cavity in 1 patient i.e.2.5% Other complications including hemorrhage, pancreaticopleural fistula and porto-splenic vein thrombosis were not observed. Of those patients with abscess, 5 were known case of Type II diabetes who were uncontrolled on hypoglycemic. They were suspected on the basis of high grade fever and marked leukocytosis and no resolution of symptoms by conservative management. When explored or percutaneously drained, pus was sent for culture which showed growth of micro organisms. All of them were alcoholics. Of the 5 patients with jaundice, two patients who showed CBD stricture were subjected to stenting. 3 patients showed gall stones. Three patients with obstruction after CT scan were subjected to upper GI scopy for diagnosis as well as therapeutic purpose. Of them 2 patients were alcoholics. One patient with rupture had presence of free fluid on CT scan with guarding and rigidity on clinical examination suggestive of peritonitis.

So complications were observed in 42.5% patients.

Various studies quote different percentages of complications, some reporting rare complications including mediastinal extension^{19,20}, intrahepatic pseudocyst²¹, portal vein fistula²² and CBD fistula²³. Soliani et al⁴ studied 74 patients and reported complications in 15 patients i.e. 20.3% ;6 with infection, 4 with jaundice, 2 with abscess. 2 with intracystic hemorrhage, 3 with GI bleeding and 2 with splenic vein thrombosis.

In our study out of 17 patients with complications 10 of them were alcoholics and 7 were non alcoholics who developed infection and obstruction as complications; followed by 3 alcoholic patients with gall stones developed obstructive jaundice.

CONCLUSION:

1. Pseudocyst of pancreas is a relatively common complication of pancreatitis, being more common in chronic pancreatitis than acute.
2. Among various etiological factors alcohol and gall stones constitute major causes for the formation of pseudocyst of pancreas.
3. Infection is the most common complication of the pseudocyst followed by jaundice.
4. Complications in pseudocyst develop irrespective of its etiology.
5. However there is mild predilection of developing obstructive jaundice as a complication in gall stone induced pancreatitis and pseudocysts. There is no much significant relation between the etiology and complications of pseudocysts.

BIBLIOGRAPHY:

1. Girdwood AH, Marks IN, Bornman PC et al, Does progressive pancreatic insufficiency limit pain in calcific pancreatitis with duct stricture or continued alcohol insult?. *J clin Gastroenterol* 1981 ; 3: 24.
2. Sankaran S, Walt AJ. The natural and unnatural history of pancreatic pseudocyst. *Br J Surg* 1975; 62: 37.
3. Yeo CJ, Bastidas JA, Lynch Nyhan A et al. The natural history of pancreatic pseudocysts documented by computerized tomography. *Surg Gynaecol Obstet* 1990 ; 70: 411-417.
4. Soliani P, Franzini C, Ziegler S, et al. Pancreatic pseudocyst following acute pancreatitis: risk factor influencing therapeutic outcomes. *Journal of pancreas*.2004; 5(5): 338-47.
5. Wen Yao Yin, Hwa-Tzong Chen, Shih Ming Huanget al. The role of surgery in pancreatic pseudocyst *Tzu Chi Med J* 2004; 16: 359-369.
6. Beebe Ds, Bubrick MP, Onstad GR, Hitchcock CR. Management of pancreatic pseudocyst. *Surg Gynaecol Obstet* 1984; 159: 562-4.
7. O'Malley VP, Cannon JP, Poatier RG. Pancreatic pseudocyst Cause, Therapy, and results. *Am J Surg* 1985; 150(6): 680-2.
8. Nguyen BL, Thompson JS, Edney JA, Brugg LE et al. Influence of the etiology of pancreatitis on the natural history of pancreatic pseudocyst. *Am J Surg* 1991; 162: 527-30.
9. Kohler H, Schafmayer A, Ludtke FE et al. Surgical treatment of pancreatic pseudocysts. *Br J Surg* 1987; 74:813.
10. Crass RA, Way LW. Acute and Chronic pancreatic pseudocysts are different. *Am J Surg* 1981: 142: 660-3.
11. Becker WF, Pratt HS, Gangi H. Pancreatic pseudocyst – Surgery. *Gynaecol Obstet* 1968; 127: 74-7.
12. Pitchumoni CS, Agarwal N. Pancreatic pseudocysts: when and how drainage should be performed. *Gastro enterol Clin North Am* 1999; 28:615-639.
13. Mc Cain Ah, Berkman WA, Bernardino ME. Pancreatic Sonography: Past and Present. *J Clin Ultrasound* 1984; 12(6): 325-332.
14. Baron TH, Morgan DE. The diagnosis and management of fluid collections associated with pancreatitis. *Am J Med* 1997; 102(6): 555-63.
15. Varghese JC, Masterson A, Lee MJ. Value of MR pancreaticography in evaluation of patients with chronic pancreatitis. *Clin Radiol* 2002; 57(5):393-401.
16. D'Egidio A, Schein M: Pancreatic pseudocyst: A proposed classification and its management implications *Br J Surg* 1992; 78: 981-984.
17. Nealon WH, Townsend CM Jr, Thompson JC. Preoperative ERCP in patients with pancreatic pseudocyst associated with resolving acute and chronic pancreatitis. *Ann Surg* 1989; 209(5): 532-8; Discussion 538-40.
18. Aranha GV, Prinz RA, Greenlee HB, Freeark RJ. Gastric outlet and duodenal obstruction from inflammatory pancreatic disease. *Arch Surg* 1984; 119(7): 833-5.
19. Umar Sadat, Asif jah and Emmanuel Huguet. Mediastinal extension of a complicated pancreatic pseudocyst – a case report. *Journal of Medical Case Reports* 2007 ; 1: 12.
20. Robert Drscher, Odo Koster and Carten Lukas. Mediastinal pancreatic pseudocyst with isolated thoracic symptoms: a case report. *Journal of Medical Case Reports* 2008; 2:180.
21. David Casado, Luis Sabater, Julio Calvete et al. Multiple intrahepatic pseudocysts in acute pancreatitis . *World J Gastroenterol* 2007; 14; 13(34): 4655-4657.
22. SE Yoon, YH Lee et al. Spontaneous pancreatic pseudocyst- Portal vein fistula presenting with pancreatic ascites : strength of MRCP. *British Institute of Radiology* 2008; 81 :e13-e16.
23. Jeber A Al Ali, Henry Chung, Peter L Munk. Pancreatic pseudocysts with fistula to the CBD resolve by combined biliary and pancreatic stenting – a case report. *Can J Gastroenterol* 2009; 23(8):557-559.

Symptoms	No. of patients	Percent (%)
Pain in abdomen	28	70
Lump	12	30
Nausea or Vomiting	21	52.5
H/o weight loss	12	30
Jaundice	5	12.5
Fever	8	20
H/o Recurrent symptoms S/o Chronic Pancreatitis	9	22.5
Symptoms		

Signs	No. of patients	Percent (%)
Fever	8	20
Icterus	5	12.5
Lump	18	45
Tenderness	28	70
Signs		

Etiological factors	No. of patients	Percent(%)
Alcohol	27	67.5
Gall Bladder	11	27.5
Trauma	1	2.5
Idiopathic	1	2.5
Etiological factors		

	Findings (Including both USG/CT)	No.
No. of cyst	Unilocular	34
	Multilocular	6
Site	Head	10
	Body	29
	Tail and Body	1
Other Complications	Ascites	1
	Abscess	8
	Rupture	1
	Haemorrhage	0
	Obstruction	3

Pre-Operative complications	No. of Patients	Percent(%)
Abscess	8	20
Haemorrhage	0	0
Obstruction	3	7.5
Rupture	1	2.5
Obstructive jaundice	5	12.5
COMPLICATIONS		

No. of Patients	Follow up	Management
7	Resolved/Remained stable	-
3	Increase in size with pain	Cystogastrostomy
2	Infection	Surgical External drainage
Conservative Management		

Endoscopic drainage	No	Follow up	Management	Surgical rate
Transpapillary	3	Resolved	-	100%
Transgastric	1	Resolved	-	33.3%
	1	Residual collection	Cystogastrostomy	
	1	Infection	Surgical external drainage	
Non-surgical management				

Procedure	No.of patients	Percent(%)	Success rate
Cystogastrostomy	12/40	30	100%
Cystojejunostomy	1/40	2.5	100%

So success rate was 100%.

No. of patients	Follow up	Management	Success rate
3	Resolved	-	60%
1	External fistula	Conservative	
1	Internal fistula	Conservative	
Surgical external drainage			

No. of patients	Follow up	Management	Success rate
2	Resolved		
2	Residual collection	Surgical external drainage	50%
Percutaneous external drainage			

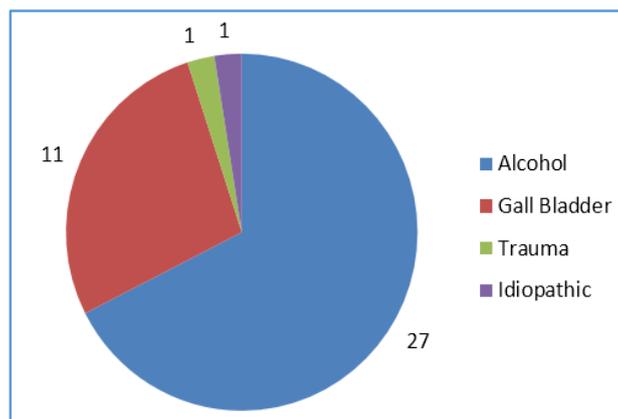
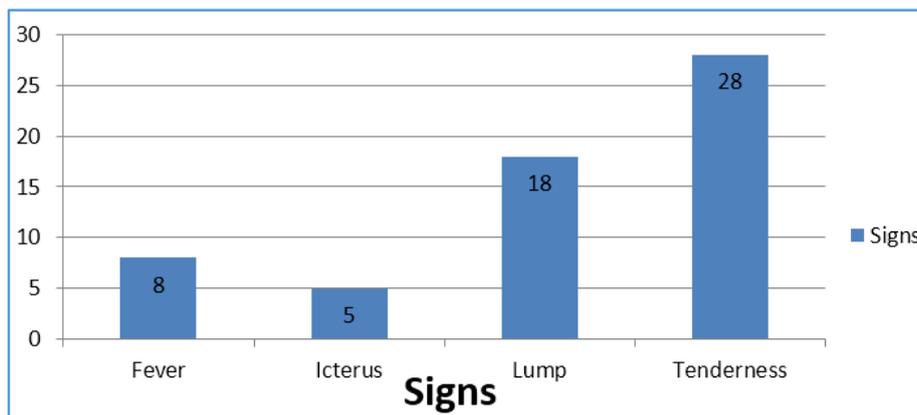
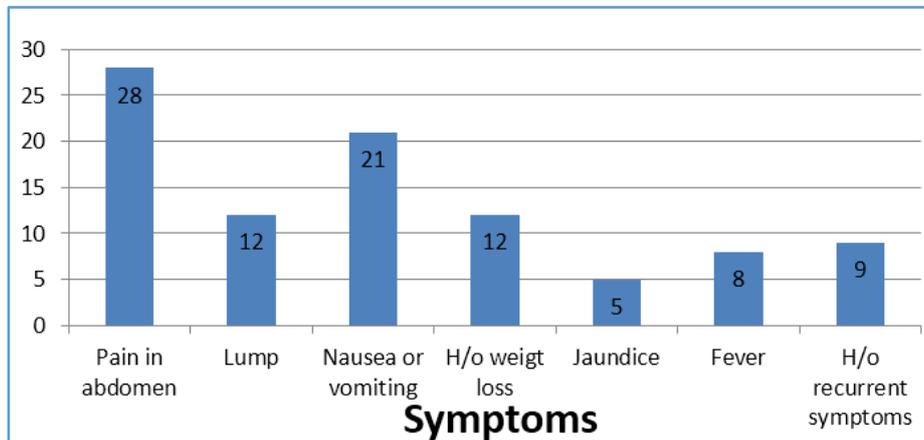
Complication	No of patients	Percent (%)
Infection	3	7.5
Fistula(Internal and External)	3	7.5
Increase in size and pain	3	7.5
Residual collection	3	7.5
COMPLICATIONS FOLLOWING TREATMENT		

Different studies	Soliani Et al ⁴	Wen-tao Et al ⁵	Beebe Et al ⁶	Our study
Range in years	33-79	15-79	23-79	24-68
Mean age in years	55.1	38.2	48.5	43.75

	Soliani Et al ⁴	Wen -yao Et al ⁵	Beebo Et al ⁶	O Malley ⁷	Our study
Total patients	74	22	55	69	40
Male	50(67.6%)	14(63.6%)	43(78.2%)	52(75.3%)	31(77.5%)
Female	24(32.4%)	8(36.4%)	12(21.8%)	17(24.7%)	9(22.5%)
Ratio	2.1:1	1.75:1	3.6:1	3.1:1	3.4:1

	Solani et al ⁴	Nguyen et al ⁸	O Malley ⁷	Kohler et al ⁹	Our study
Total patients	74	90	69	54	40
Alcohol	24.3%	46.7%	78%	65%	67.5%
Gall stone	70.3%	13.3%	7%	15%	27.5%
Trauma	2.7%	-	3%	7%	2.5%
Postoperative	1.4%	15.6%	13%	-	-
Idiopathic	1.3%	-	9%	9%	2.5%
Other causes	-	24.4%	-	4%	-

	O Malley ⁷	Crass et al ¹⁰	Becker et al ¹¹	Our Study
Pain in abdomen	94%	90%	88%	70%
Nausea and Vomiting	62%	44%	59%	52.5%
Lump	23%	60%	62%	45%
Weight loss	25%	42%	6%	30%
Fever	16%	26%	51%	20%
Jaundice	-	-	13%	12.5%



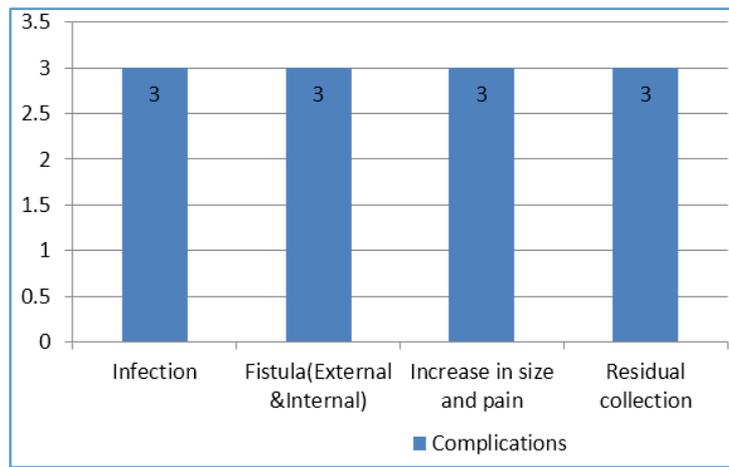


Figure 1: Usg abdomen showing pseudocyst of pancreas



Figure 2: CECT abdomen showing pseudocyst of pancreas

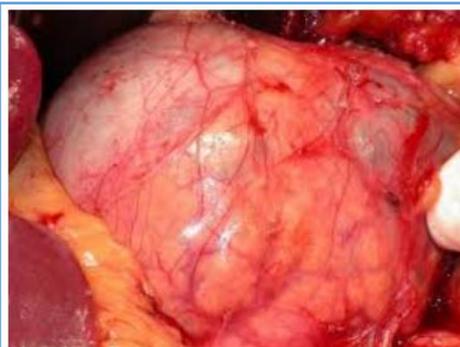


Figure 3: showing infected pseudocyst

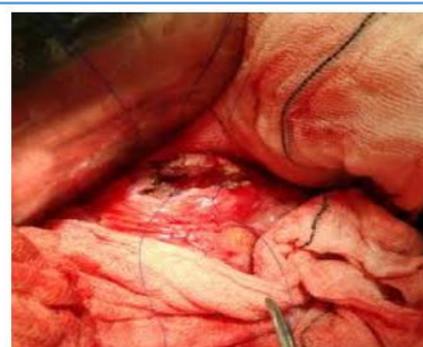


Figure 4: Showing Cystojejunostomy



Figure 5: Showing Cystogastrostomy