



A COMPARATIVE ANALYSIS OF CONSERVATIVE VERSUS SURGICAL MANAGEMENT FOR PANCREATIC PSEUDOCYSTS – A RETROSPECTIVE COHORT STUDY.

General Surgery

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KEYWORDS

INTRODUCTION:

Pancreatic pseudocysts are fluid-filled sacs that develop within the pancreatic tissue or the surrounding pancreatic space. They are characterized by a non-epithelialized wall composed of fibrous and granulation tissue, hence the term “pseudo” cyst. These sacs are encapsulated collections of homogeneous fluid with minimal or no necrotic tissue within them. They are filled with amylase rich fluid. Typically, pancreatic pseudocysts are well-defined and situated outside the pancreas, often in the lesser sac. About one-third of pseudocysts are located near the head of the gland, and the remaining two-thirds occur in the tail. The pathogenesis of a pseudocyst formation in chronic pancreatitis is not well understood, but it may involve acute exacerbation of underlying pancreatitis with new calculus or protein plug formation in the pancreatic ducts.

Pancreatic pseudocysts are commonly associated with chronic pancreatitis, although they can also develop as a complication of acute pancreatitis, post-operative complications, or after pancreatic trauma. The formation of pseudocysts is typically attributed when there is disruption of the main pancreatic duct or its branches, either from inflammation or direct injury which can be caused by biliary stones or excessive alcohol consumption, causing extravasation of pancreatic enzymes into the parenchyma and eventually forms a distinct collection. Alcohol-related pancreatitis is the major cause of pancreatic pseudocyst formation. Despite their prevalence, the overall incidence of pancreatic pseudocysts remains relatively low.

Pseudocysts may be asymptomatic or present with nonspecific symptoms, including vague abdominal pain, satiety, upper gastrointestinal bleeding, nausea, and vomiting. However, a history of preceding acute or chronic pancreatitis, in conjunction with classic imaging findings of a thick-walled, well-defined, fluid-filled mass adjacent to the pancreas, is almost certainly pathognomonic of a pancreatic pseudocyst. A contrast-enhanced computed tomography (CT) scan of the abdomen is the diagnostic modality of choice. The maturation period of pancreatic pseudocysts is reported to be approximately 4-6 weeks, during which time 33% of cysts are expected to spontaneously resolve. However, a substantial number of persistent cysts require treatment due to potential complications such as infection, hemorrhage, and cyst rupture.

Early observations suggested that pancreatic pseudocysts larger than 6 cm in diameter and persisting longer than 6 weeks were unlikely to resolve spontaneously. Later data indicated that about half of acute pseudocysts remain asymptomatic. No reliable indicators predict the course of established pseudocysts. However, surgeons continue to follow the 'Rule of 6' for treating pseudocysts (cysts >6 cm or duration >6 weeks), assuming spontaneous resolution or sturdy cyst walls for suture holding.

Pancreatic pseudocysts are fluid-filled collections enclosed by a non-epithelialized wall, commonly developing as a complication of acute or chronic pancreatitis. They constitute a substantial portion of pancreatic fluid collections and can lead to severe complications, including infection, hemorrhage, rupture, and obstruction, if left

untreated. The optimal management strategy remains a topic of ongoing debate, with treatment approaches ranging from conservative management to minimally invasive and surgical interventions.

The decision between conservative and surgical treatment for pseudocysts is depending upon various factors, such as pseudocyst size, duration, symptoms, complications, and patient comorbidities. Conservative management, which encompasses observation, endoscopic drainage, and percutaneous aspiration, is frequently preferred for asymptomatic, diminutive, or stable pseudocysts. Nevertheless, when complications manifest, surgical interventions, such as cystogastrostomy, cystojejunostomy, or open drainage procedures may be necessary to attain definitive resolution.

Advancements in endoscopic and minimally invasive techniques have revolutionized the surgical landscape, propelling the treatment paradigm towards less invasive approaches. Nevertheless, the long-term efficacy, recurrence rates, and complication risks associated with these strategies continue to be subject to clinical scrutiny. Despite the growing adoption of endoscopic and laparoscopic techniques, there remains a lack of harmony regarding the optimal approach, particularly in instances where conservative treatment proves ineffective.

This comparative analysis evaluates the outcomes, advantages, and limitations of conservative versus surgical treatment for pancreatic pseudocysts. By assessing factors such as resolution rates, recurrence, complications, hospital stay, and overall patient prognosis, this study seeks to provide evidence-based insights into the most effective treatment strategies. The findings will contribute to guiding clinical decision-making, improving patient outcomes, and enhancing personalized treatment protocols for pancreatic pseudocysts.

Aims And Objectives:

1. To compare the effectiveness, safety, and long-term outcomes of conservative versus surgical treatment options for pancreatic pseudocysts, with the goal of providing evidence-based recommendations for optimal management.
2. To evaluate the clinical outcomes of conservative management (observation, Percutaneous drainage, endoscopic drainage) versus surgical intervention (cystogastrostomy, cystojejunostomy, open/laparoscopic drainage).

MATERIALS AND METHODS

This is a retrospective cohort study comparing conservative and surgical treatment options for pancreatic pseudocysts based on clinical outcomes, complication rates, and overall patient prognosis. Data were collected over a period between January 2023 and January 2025 of 35 patients with pancreatic pseudocysts treated. The study was conducted at Sardar Patel Medical College & Attached group of hospital Bikaner, a tertiary care center specializing in gastroenterology and pancreatic diseases. Patients diagnosed with pancreatic pseudocysts based on clinical presentation, imaging findings (CT, MRI, or ultrasound), and biochemical markers was selected.

Inclusion Criteria:

- Patients aged ≥ 18 years with a confirmed diagnosis of pancreatic pseudocyst.
- Patients managed with either conservative (observation), percutaneous/endoscopic drainage) or surgical intervention (cystogastrostomy, cystojejunostomy, open/ laparoscopic drainage).

Exclusion Criteria:

- Patients with pancreatic neoplasms or malignancy-related cystic lesions.
- Patients with incomplete medical records or lost to follow-up.
- Cases with coexisting severe systemic diseases that preclude surgical intervention.

Data Collection:

Data were retrieved from medical records and patient databases using a structured data extraction form, collecting the following information:

1. **Demographic Details:** Age, sex, BMI, comorbidities.
2. **Clinical Presentation:** Abdominal pain, jaundice, nausea, vomiting, weight loss.
3. **Diagnostic Findings:** CT/MRI/Ultrasound reports (pseudocyst size, location, wall thickness, fluid characteristics). MRI and magnetic resonance cholangiopancreatography(MRCP) are the most sensitive and accurate diagnostic tools for pancreatic pseudocyst. MRI is also sensitive in detecting bleeding and complex fluid collections.

Treatment Approach:

1. **Conservative Management:** The gold standard for the treatment of uncomplicated Pancreatic Pseudocyst.

- **Observation**

Over 70 per cent of pseudocysts appeared to resolve spontaneously within 3-12 weeks.

- **Endoscopic Cyst Drainage**

The primary objective of endoscopic drainage is to establish a communication between the pseudocyst and the digestive tract. This is achieved through transmural or transpapillary drainage techniques. Transmural drainage (TSM) involves inserting a catheter through the gastric, duodenal, or jejunal wall when the distance between the pseudocyst and the gastrointestinal wall is less than 1 cm. Conversely, transpapillary drainage (TPD) is performed via endoscopic retrograde cholangiopancreatography when the pseudocyst cavity communicates with the pancreatic duct.

- **Percutaneous drainage(PD)**

External drainage was recommended for ruptured cysts, as well as for patients with symptomatic or infected mature cysts and compromised physical condition. Several percutaneous drainage techniques, including simple percutaneous aspiration drainage and continuous percutaneous drainage, can be performed using a USG or CT scan. Drainage is achieved via a 7-12 French (Fr) pigtail catheter, which is inserted into the pseudocyst through needle-inserted guidewires.

2. **Surgical Management:** Open/laparoscopic cystogastrostomy, cystojejunostomy, external drainage(ED)

Indications**1. Complicated Pseudocyst:**

- Compression of major veins
- Gastric or duodenal obstruction
- Compression of the main bile duct
- Associated with pancreatic ascites or a pancreatic-pleural fistula
- Infected pancreatic pseudocyst
- Hemorrhage in the pancreatic pseudocyst

2. Symptomatic Pseudocyst:

- Feeling of satiety
- Nausea, Vomiting
- Severe abdominal pain and/or back pain
- Upper gastrointestinal bleeding

3. Asymptomatic Pseudocysts (>6 cm without regression for >6 weeks):

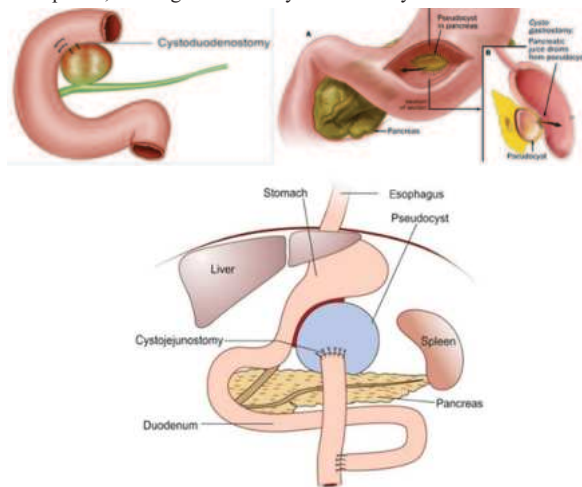
- Drainage was the treatment of choice.

4. Patients With An Extrahepatic Pseudocyst

- **External Drainage**

External drainage is the operation of choice for grossly infected cysts, those associated with hemorrhage or free rupture necessitating emergency laparotomy, and immature cysts with a soft wall that will not hold sutures.

- The method of choice for all mature uncomplicated pseudocysts it establishes a controlled fistula into the gastrointestinal tract and is the method of choice for all mature uncomplicated pseudocysts. Cystogastrostomy and cystojejunostomy are alternative procedures for establishing internal decompression. Cystoduodenostomy is occasionally indicated for a small cyst in the pancreatic head.
- **Cystogastrostomy** is chosen when the pseudocyst is located in the epigastric region and adheres to the stomach. Cysto-gastrostomy is beneficial since it allows for postoperative drainage using a nasogastric tube; although, an increased risk of infection exists due to the tendency for gastric and pancreatic secretions to pool in the dependent part of the pseudocyst, leading to abscess formation and/or a higher likelihood of sepsis. Cystogastrostomy is also associated with a higher risk of postoperative hemorrhage compared with cystojejunostomy. The cyst wall was biopsy confirmed pancreatic pseudocyst.
- **Cystojejunostomy** is the option of choice when the pseudocyst is very large and extends beyond the epigastric region to the umbilical, hypochondriac and lumbar region. This procedure allows for dependent drainage and is the anastomosis of choice for giant pseudocysts
- **Cystoduodenostomy** is chosen when the pseudocyst is located in the head of the pancreas and adheres to the duodenum. This procedure is not feasible if a thick rim of pancreatic parenchyma is between the pseudocyst and duodenal wall. This procedure has also been considered the most technically demanding of the three options, with higher morbidity and mortality rates.

**Ethical Considerations**

Exemption of Ethical approval was given because no identifiable patient's parts were seen.

RESULT:

1. Treatment success was 100% in conservative group and 93.4% in the surgical group.
2. Complication rates were significantly higher in the surgical group (56%), while no complications were reported in conservative cases.
3. No recurrence in the conservative group, whereas recurrence occurred in 6.6% of surgical patients.
4. Hospital stay was significantly shorter for conservatively treated patients (Mean: 1.5 weeks) compared to surgically treated patients (Mean: 3 weeks).
5. Mortality occurred in 7.5% of surgical patients, while 1% deaths were reported in the conservative group.
6. Intractable pain (20%) was more frequent in surgical patients compared to 6.6% in conservative patients.
7. Abscess (10%) and Sepsis (10%) were also more common in surgical intervention
8. When compared with ED, percutaneous intervention seems to have similar percentages of success rates and clinical success, but

PD has worse results in terms of hospital stay and rates of recurrence.

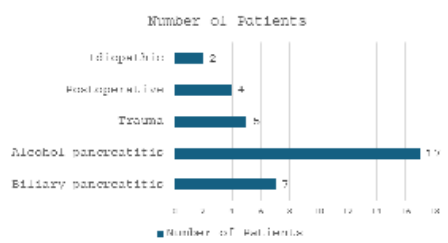


Chart 1. Etiology of Pancreatic Pseudocysts

Table 1. Outcomes In Surgical Versus Endoscopic Intervention

Demographics	Conservative (%)	Surgical (%)
Pseudocyst Resolution	100	93.4
Complication	0	56
Pain	6.6	20
Sepsis/ Abscess	4	10
Hemorrhage	2	6
Pancreatic fistula	1	5
Pneumonia/ Pleural Effusion	17	19
Rupture	18	2
Recurrence	0	8
Hospital stays	1.5 week	3.5 week
Mortality	1	7.5

DISCUSSION

This comparative analysis evaluates the efficacy of conservative versus surgical treatment approaches for pancreatic pseudocysts. The findings reveal distinct outcomes in terms of treatment success, recurrence, complications, hospital duration, and mortality rates. Notably, conservative management demonstrated a 100% success rate, characterized by the absence of recurrence and substantially reduced complication rates compared to surgical intervention. Conversely, surgical treatment, while effective in 93.4% of cases, was associated with a higher incidence of complications, extended hospital stays, and an increased mortality rate of 7.5%.

The findings further support the notion that not all pancreatic pseudocysts necessitate active intervention. In certain instances, conservative management can be a safe and effective first line approach for select patients. Nevertheless, surgical intervention remains crucial in complex cases despite the inherent risks associated with it.

Pseudocysts may resolve spontaneously; this was demonstrated by Lewis et al., who studied traumatic pancreatic pseudocysts following peripheral duct injury. Unresolved pseudocysts should be treated to prevent hemorrhage, perforation, infection, or bowel or bile duct obstruction.

Our findings concur with those of Zeb et al. (2023), who demonstrated the efficacy of conservative management in numerous instances, thereby reducing hospital stays and mitigating intervention-related complications. The study underscored the necessity of intervention for non-regressing, symptomatic, or complicated pseudocysts. Furthermore, radiology-assisted external drainage exhibited a superior success rate compared to conventional surgical drainage.

Similarly, studies conducted by Bradley et al. (1979) and Tan et al. (2018) have demonstrated that pseudocysts smaller than 6 centimeters or those persisting for less than six weeks tend to resolve spontaneously, thereby supporting the rationale for conservative management in stable cases. Conversely, pseudocysts that persist beyond 6 weeks or exceed 6 centimeters in size exhibit a diminished likelihood of resolution and may necessitate surgical intervention.

Despite advancements in endoscopic and minimally invasive techniques, our study highlights that surgical intervention is still associated with higher morbidity and mortality, consistent with previous research by Farias et al. (2019) and Cheruvu et al.

The low recurrence rate in surgically treated patients is consistent with the findings of Rasch et al. (2017), who reported lower re-intervention rates with surgical drainage compared to percutaneous techniques.

However, the higher complication rates in surgical patients raise concerns about the risks associated with aggressive intervention.

The longer hospital stays in surgically treated patients 3 weeks vs. 1.5 weeks in the conservative group is a critical finding, emphasizing the burden of surgical interventions on healthcare resources. These findings are in line with Wang et al. (2019), who reported that surgical patients had significantly longer recovery times compared to those managed conservatively.

Alcoholism and multiple comorbidities were identified as major contributors to poor surgical outcomes, as previously reported by Rana et al. (2020)

Based on our findings and existing literature, the following clinical recommendations can be made:

1. Conservative management should be the first-line approach in asymptomatic or stable pseudocysts, avoiding unnecessary surgical risks.
2. Intervention should be considered in pseudocysts that are symptomatic, larger than 6 cm, or persist beyond 6 weeks, with preference for less invasive techniques (radiology-guided or endoscopic drainage) over open surgery.
3. Surgical intervention should be reserved for complicated cases (infection, rupture, gastric obstruction, intractable pain), but clinicians must weigh the risks of high complication and mortality rates.
4. Multidisciplinary care involving surgeons, gastroenterologists, interventional radiologists, and are crucial for optimizing treatment strategies and improving outcomes.

CONCLUSION

In symptomatic patients with complications from pseudocyst, intervention options include percutaneous, surgical, and endoscopic drainage. If the pseudocyst is larger than 6 cm or older than 6 weeks, or if conservative management fails percutaneous drainage considered but carries a high risk of secondary catheter infection, making surgical drainage the gold standard. Laparoscopic techniques are increasingly popular as a minimally invasive option. Endoscopic drainage with ultrasound guidance has a high success rate, shorter hospital stays, and reduced costs, making it the preferred technique.

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