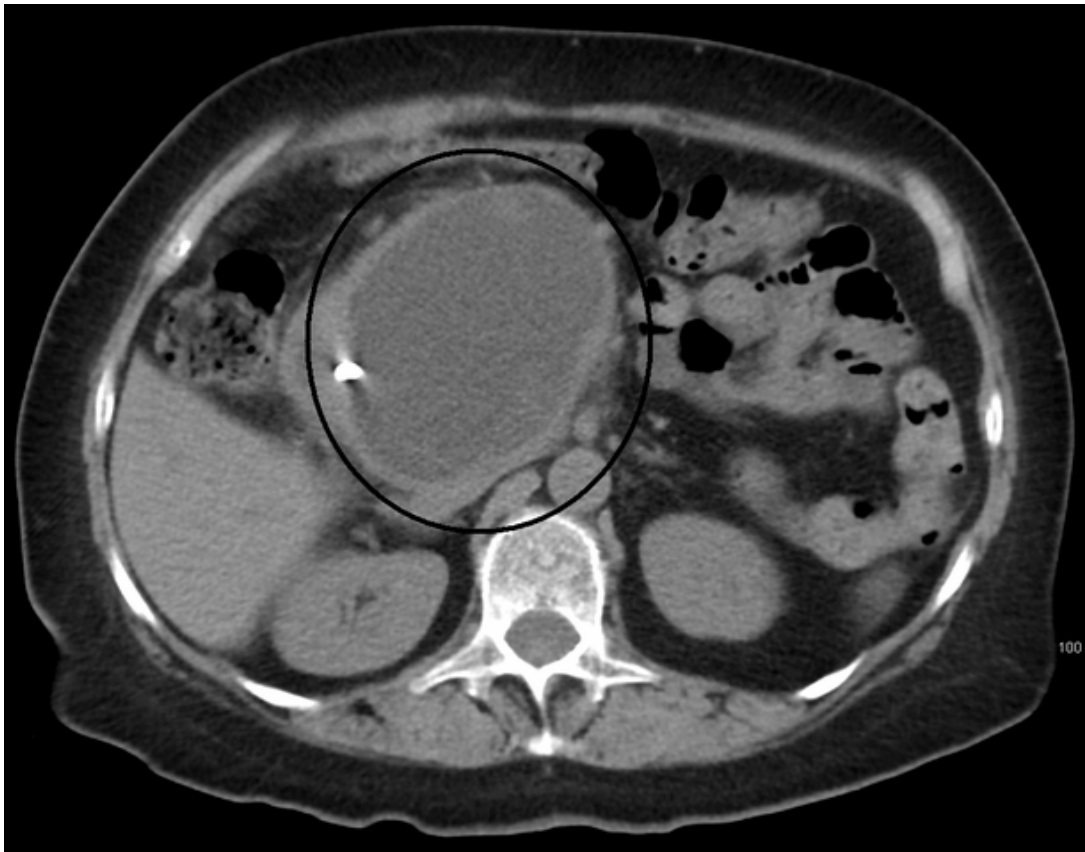


Pancreatic Pseudocysts — Diagnosis and Treatment

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Pancreatic pseudocysts are a complication of acute pancreatitis, and they are more common when the etiology is alcohol-related. These pseudocysts do not have an epithelial wall, and their fluid content is rich in amylase, lipase, and trypsin. Abdominal CT scan is the diagnostic modality of choice to confirm the diagnosis of pancreatic pseudocysts and exclude complications. MRI or ERCP can be used to assess communication between the pseudocyst and the pancreatic duct, and if present, transpapillary drainage of the pseudocyst can be attempted.



Definition of Pancreatic Pseudocysts

Pancreatic pseudocysts are **fluid collections** that may occur a few weeks **after an episode of acute pancreatitis**. These collections contain several **pancreatic enzymes** and do not have an epithelial wall.

Pancreatic pseudocysts are different from **acute fluid collections** that occur during the

episode of acute pancreatitis, where the latter is more of an inflammatory process.

Epidemiology of Pancreatic Pseudocysts

Pancreatitis is more common in males, and so is the incidence of pancreatic pseudocysts. Approximately 14.6% of the patients who experience acute pancreatitis are expected to develop a pancreatic pseudocyst as a complication. On the other hand, pancreatic pseudocysts are way more common in acute-on-chronic pancreatitis, especially of alcoholic etiology, and can be identified in up to 41% of the cases.

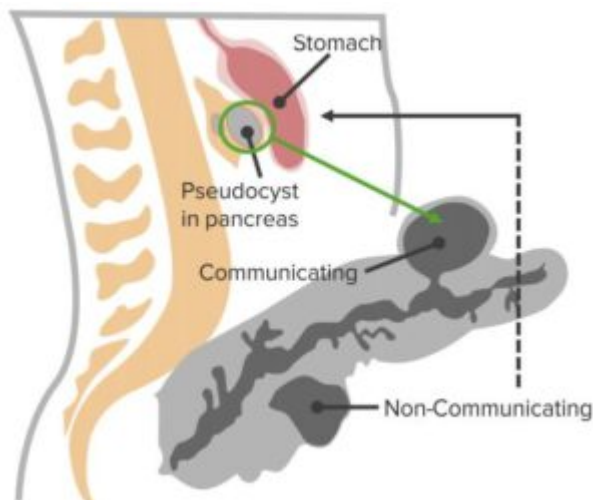
There aren't many case studies on the incidence of pancreatitis in children. The presence of pseudocysts may create complications in the cases of acute pancreatitis. Pseudocysts affect acute pancreatitis in 10 to 23% of the patients.

Etiology of Pancreatic Pseudocysts

The most common etiologies for pancreatic pseudocysts are:

1. **Alcoholic pancreatitis**
2. **Acute (on top of chronic) pancreatitis.**
3. **Gallstone disease** related to pancreatitis can also cause pancreatic pseudocysts.
4. In children, **blunt abdominal trauma** is a common etiology for pancreatic pseudocysts.

Pathophysiology and Clinical Presentation of Pancreatic Pseudocysts



"Pancreatic Pseudocyst" Image created by Lecturio

For pancreatic pseudocysts to form, **disruption of the pancreatic ducts** needs to happen first. Pancreatitis, regardless of the etiology or trauma, can cause acute disruption of the pancreatic ductal system, which then allows for pancreatic enzymes to escape and to start an inflammatory process in nearby structures. This inflammatory process results in the formation of a **fibrous wall around the pseudocyst** where further fluid accumulates.

The size of these pseudocysts can range from 2 to 30 cm and they can be multiple,

especially in alcoholic pancreatitis. 60% of the pseudocysts occur at the pancreatic tail, and their fluid has amylase, lipase, and trypsin.

The most commonly presented symptom of pancreatic pseudocysts is **abdominal pain**. There is usually a recent history of acute pancreatitis unless the etiology is abdominal trauma. Patients can also have **anorexia** or can complain of an abdominal mass if the pseudocyst is large enough.

Pseudocysts can become infected, and in that case, patients would present with a **fever**. **Pleural effusion**, another acute pancreatitis complication, can co-occur with pancreatic pseudocysts.

Physical examination is usually unremarkable unless the pseudocyst is large enough and can be palpated. **Tenderness** can be elicited in patients with pancreatic pseudocysts. If the tenderness is severe or there is **abdominal rigidity**, pseudocyst rupture or infection has to be excluded.

Chest examination can reveal dullness to percussion and decreased breathing sounds in the lower lung fields due to pleural effusion. Fever can be present if the pseudocyst gets infected. **Jaundice** has been reported as a result of sepsis caused by pancreatic pseudocyst infection.

Diagnostic Work-up for Pancreatic Pseudocysts

Patients who develop a pancreatic pseudocyst can have an **elevated serum amylase and lipase levels**, but this is not necessary for a diagnosis. **Liver enzymes** and **bilirubin** are usually elevated in gallstone pancreatitis and related pseudocysts.

Older patients who present with a pancreatic pseudocyst, without a clear history of recent pancreatitis, should have the cyst's fluid aspirated and examined to exclude **malignancy**. **Carcinoembryonic antigen** is elevated in pancreatic malignant cysts.

The fluid content of the pseudocyst is usually of **low viscosity**, and **pancreatic enzymes' levels** are elevated in the fluid aspirated from the pseudocyst.

Imaging is also crucial in the evaluation of a patient with a pancreatic pseudocyst. **Ultrasonography** can identify abdominal cysts but is not sensitive enough to be considered as the best choice to establish the diagnosis of a pancreatic pseudocyst.

Endoscopic ultrasonography is beneficial when the pseudocyst is symptomatic and **transmural drainage** through the stomach wall is planned.



Image: "A pancreatic pseudocyst as seen on CT scan" by James Heilman, MD - Own work. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

The best imaging modality to diagnose pancreatic pseudocysts is a **computerized tomography (CT) scan of the abdomen**. A CT scan usually reveals a cyst-like structure in the pancreas that could be single or multiple as seen in the figure. **Pancreatic calcifications**, a marker of pancreatitis, can also be visualized on a CT scan. Pseudocysts can erode the **splenic artery** and cause **intra-cyst hemorrhage**, which can be excluded by a CT scan. **Endoscopic retrograde cholangiopancreatography (ERCP)** is used for drainage of the pseudocysts but not as a diagnostic modality. **Magnetic resonance imaging (MRI)** is indicated in patients with fever or sepsis to exclude **necrotizing pancreatitis**.

Treatment of Pancreatic Pseudocysts

A **wait-and-see approach** is advisable in most cases of uncomplicated pancreatic pseudocysts as the majority of them resolve without any specific treatment. The decision to go for pseudocyst drainage should be based on the presence of symptoms and not the size of the pseudocyst.

The treatment of choice for symptomatic or infected pseudocysts, or when there is a concern about malignancy, is **drainage**. If drainage is planned, pancreatic pseudocyst anatomy has to be assessed, which can be achieved by either an **ERCP** or **MRI study**. If pancreatic duct strictures are identified, surgical drainage of the pseudocyst is recommended.

Larger symptomatic pseudocysts can cause abdominal pain that is related to eating fatty diets. In these patients, it is advisable to eat a low-fat diet and, if the pain is very severe, to switch to **parenteral or enteral nutrition**.

Patients with **pancreatic duct stenosis** might benefit from a **stent placement**, which facilitates the pseudocyst resolution. If a **percutaneous drain** is used, care should be taken to look for possible infection.

Percutaneous aspiration is used for diagnostic and not therapeutic intentions because the recurrence rate of the pseudocyst is high. Additionally, percutaneous aspiration can introduce **pathogens** to the pseudocyst and increases the risk of infection.

Percutaneous catheter drainage is indicated in infected pancreatic pseudocysts.

When the pseudocyst's wall thickness is < 1 cm, **endoscopic drainage** with ERCP or transmural through the stomach can be attempted.

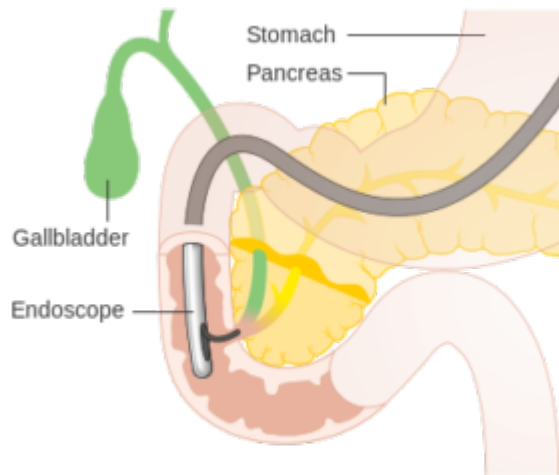


Image: "Detailed diagram of an endoscopic retrograde cholangio pancreatography (ERCP)." by Cancer Research UK - Original email from CRUK. License: [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)

ERCP drainage of the pseudocyst is achieved through a **transpapillary approach**. For this method to be possible, communication between the pseudocyst and the pancreatic duct needs to be confirmed. The communication between the pseudocyst and the pancreatic duct can be visualized either by MRI or with ERCP.

Transmural drainage is done when **upper endoscopy** reveals a stomach bulge due to the compression of the pseudocyst on the stomach wall. A small incision is made through the stomach wall and access to the pseudocyst is achieved. Placement of **multiple pigtail stents** is done, and communication between the pseudocyst and the stomach cavity is secured, where the pseudocyst is allowed to drain.

Both ERCP and transmural drainage have similar efficacy and are safe procedures if performed by an experienced surgeon.

In 2013, **AXIOS stents** were FDA approved for the treatment of pancreatic pseudocysts. These stents allow the drainage of the pancreatic pseudocyst into the gastrointestinal tract and are usually a temporary measure. Once the patient improves and the pseudocyst resolves, removal of the stent is indicated.

Complications of Pancreatic Pseudocysts

Pancreatic pseudocysts can lead to the following complications:

- Blockage of the intestines
- Loss of blood due to injury to surrounding blood vessels
- Infection

Prognosis of Pancreatic Pseudocysts

Surgery may be required to remove the pseudocysts if there is a possibility of them causing cancer or other serious conditions. The prognosis is usually good for the majority of patients treated from pseudocysts.

References

Kim KO, Kim TN (2012) Acute pancreatic pseudocyst: incidence, risk factors, and clinical outcomes. *Pancreas* 41:577–81. doi: 10.1097/MPA.0b013e3182374def

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