

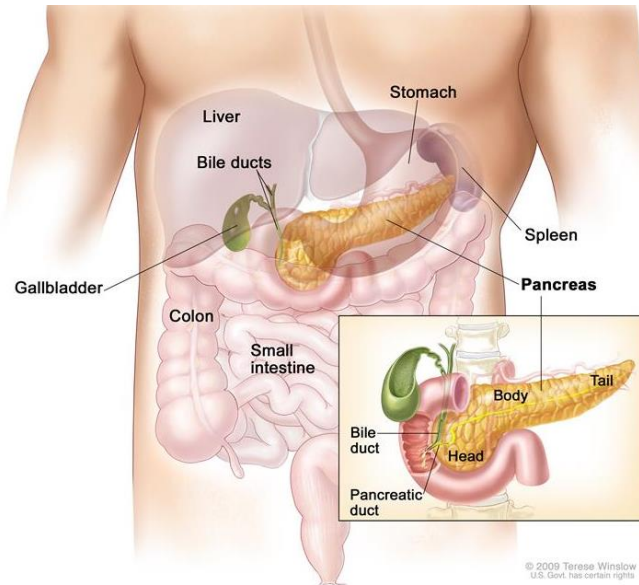
THE PANCREAS.



The pancreas is a large gland behind the stomach and next to the small intestine.

Function.

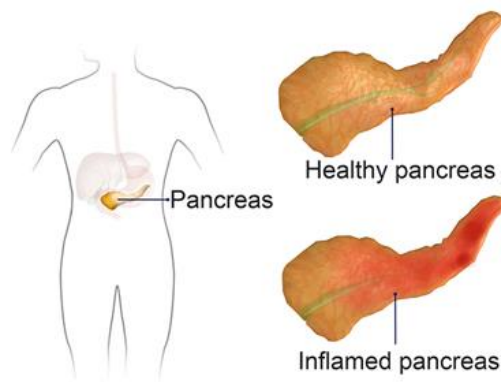
- It produces important digestive enzymes (pancreatic enzymes) into the small intestine to aid in food digestion.
- It produces the hormones insulin and glucagon into the bloodstream which regulate blood glucose/ sugar levels.



There are a variety of disorders which involve the pancreas, including pancreatic pseudocysts, pancreatitis, and pancreatic cancer.

PANCREATITIS.

Pancreatitis is a disease in which the pancreas becomes inflamed. It occurs when the digestive enzymes are activated before they are released into the small intestine and begin digesting the pancreas itself.



There are two forms of pancreatitis: acute and chronic.

Acute pancreatitis is a sudden inflammation that lasts for a short time. It may range from mild discomfort to a severe, life-threatening illness. In severe cases, acute pancreatitis can result in bleeding into the gland, serious tissue damage, infection, and cyst formation. Severe pancreatitis can also harm other vital organs such as the heart, lungs, and kidneys.

Chronic pancreatitis is long-lasting inflammation of the pancreas. It most often happens after an episode of acute pancreatitis or many years of heavy alcohol drinking.

Causes

In up to 15%- 30% of people with pancreatitis, the cause is unknown.

Known causes include:-

- Gallstones
- Heavy alcohol use.
- Metabolic disorders,
- Medications
- Infections
- Trauma and surgery.
- Hereditary disorders of the pancreas.
- Cystic fibrosis.
- High Triglycerides

Symptoms

- Upper abdominal pain that radiates to the back; it may be aggravated by eating, especially foods high in fat.
- Swollen and tender abdomen
- Nausea and vomiting
- Fever
- Increased heart rate
- Weight loss

Diagnosis

To diagnose acute pancreatitis, doctors measure levels in the blood of *two digestive enzymes, amylase and lipase*. High levels strongly suggest acute pancreatitis.

Other tests include:-

- Pancreatic function test to find out if the pancreas is making the right amounts of digestive enzymes.
- Glucose tolerance test to measure damage to the cells in the pancreas that make insulin.
- Ultrasound, CT scan, and MRI, which make images of the pancreas so that problems may be visualized.
- ERCP to look at the pancreatic and bile ducts using X-rays.
- Biopsy, in which a needle is inserted into the pancreas to remove a small tissue sample for study.
- In more advanced stages of the disease, doctors may use blood, urine, and stool tests to confirm the diagnosis.

Treatment.

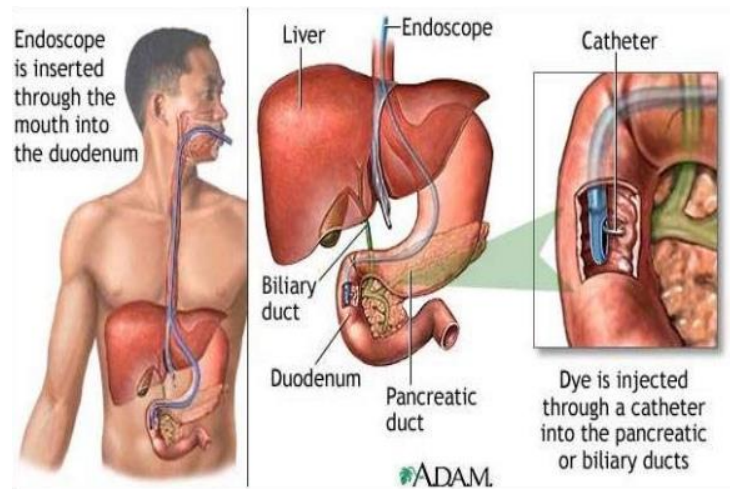
Treatment for acute/chronic pancreatitis may include nutritional support with feeding tubes or intravenous (IV) nutrition, enzyme supplements, antibiotics and pain medication. Surgery may be necessary to deal with complications or remove part or the entire pancreas.

Endoscopic retrograde cholangiopancreatography (ERCP)

ERCP is a procedure that combines upper gastrointestinal (GI) endoscopy and x rays to diagnose and treat pancreatitis and other problems of the pancreatic ducts. ERCP may be performed if a person's bile or pancreatic ducts are suspected of being narrowed or blocked.

If a problem is found, the physicians can then insert special tools through the endoscope to open blocked ducts, break up or remove gallstones, remove tumors in the ducts, or insert stents to restore the flow of pancreatic or bile fluid. A biopsy may also be taken through the endoscope, in order to evaluate cells for infection or cancer.

If gallstones are the cause of pancreatitis, they may be removed during ERCP, to be followed by removal of the gallbladder (called cholecystectomy).



Surgery

Depending on the cause of pancreatitis, the patient's anatomy, level of pain, and other factors, surgery may be an appropriate treatment.

Surgery may be needed to drain pseudocysts, or accumulations of fluid and tissue in the pancreatic area.

Removal of the entire pancreas (total pancreatectomy) may be performed in order to reduce or eliminate intractable pain associated with chronic pancreatitis. Total Pancreatectomy relieves pain in 90% of cases, but causes patients to become diabetic.

Prognosis for Patients with Pancreatitis

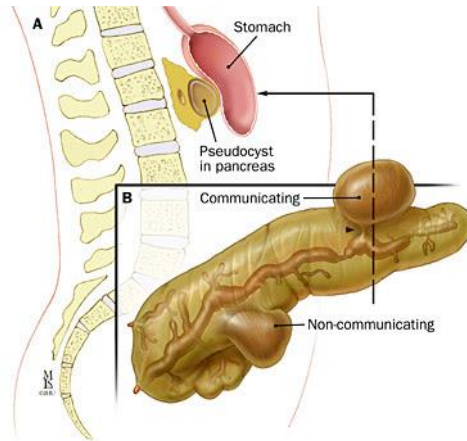
Acute Pancreatitis- Acute pancreatitis can be very serious, even life threatening, but most patients can expect complete recovery.

Chronic Pancreatitis- Acute pancreatitis can become chronic if pancreatic tissue sustains damage and scarring occurs. About 5% of patients need long-term treatment. About half of patients with chronic pancreatitis develop pain that is severe enough to warrant treatment with a procedure to drain fluid,

remove part or the entire pancreas, remove gallstones or place a stent to unblock the bile or pancreatic duct.

PANCREATIC PSEUDOCYSTS.

A **pancreatic pseudocyst** is a collection of fluid around the pancreas. The fluid in the cyst is usually pancreatic juice that has leaked out of a damaged pancreatic duct. It may contain blood and necrotic tissue. **Pancreatic pseudocysts** arise after acute/ chronic pancreatitis.



Signs and symptoms.

Can occur within days to months after an attack of pancreatitis, and include:

- Bloating of the abdomen/ abdominal discomfort.
- Constant pain or deep ache in the abdomen, which may also be felt in the back
- Difficulty eating and digesting food

Diagnosis

- Through patient's Signs and symptoms.
- Physical examination: - the cyst will feel like a lump in the middle or left upper abdomen.
- Cyst fluid analysis:
 - Carcinoembryonic antigen (CEA) and CEA-125 (low in pseudocysts and elevated in tumors);
 - Fluid viscosity (low in pseudocysts and elevated in tumors);
 - Amylase (usually high in pseudocysts and low in tumors)

The most useful imaging tools are:

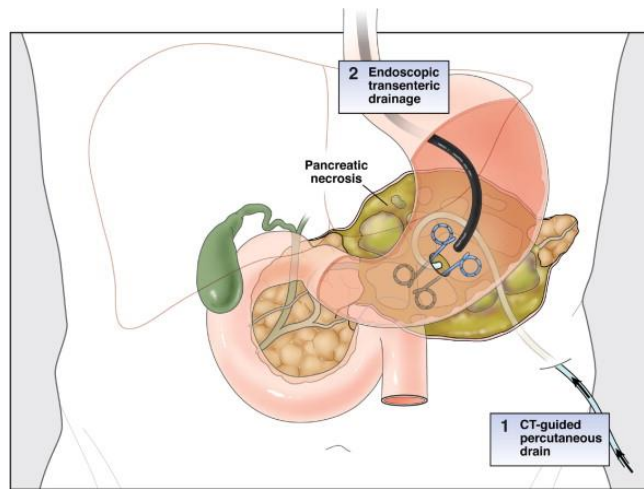
- Abdominal Computerized tomography (CT scan) - This is the gold standard for initial assessment and follow-up.
- Abdominal Ultrasonography
- Endoscopic Ultrasound.
- Magnetic resonance cholangiopancreatography (MRCP) - to establish the relationship of the pseudocyst to the pancreatic ducts, though not routinely use

With improved access to high quality abdominal imaging, pancreatic cysts are being diagnosed with increased frequency. Pancreatic cysts are identified in 1-2% of patients undergoing CT or MRI of the abdomen for an unrelated indication. Inflammatory cysts arise in the setting of pancreatitis.

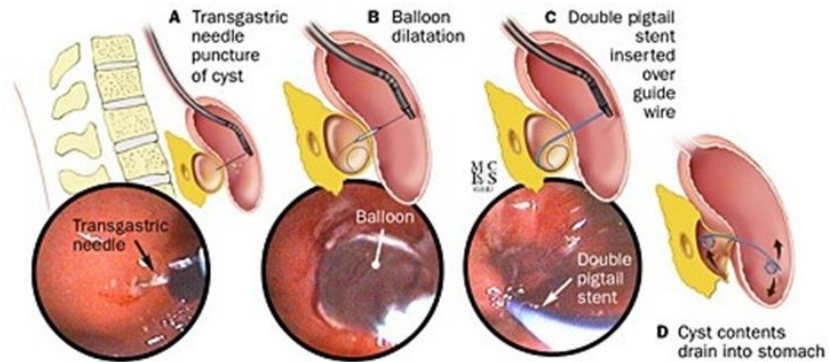
Treatment

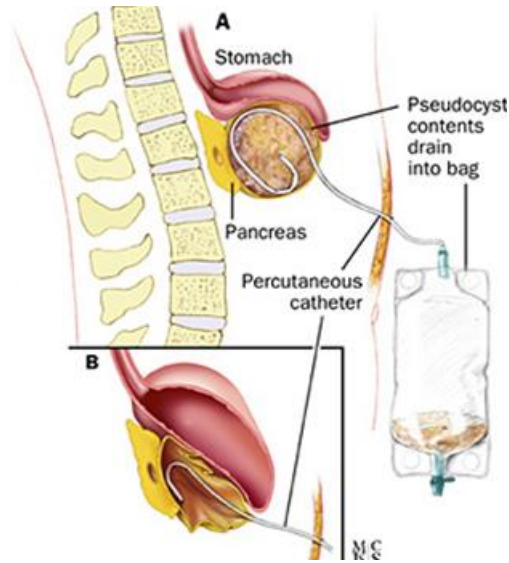
Treatment depends on the size of the pseudocyst and whether it is causing symptoms. Many pseudocysts go away on their own. Those that remain for more than 6 weeks and are larger than 5 cm in diameter often need treatment. This includes:-

- Endoscopic-assisted drainage using an endoscope (a tube containing a camera and a light that is passed down into the stomach)



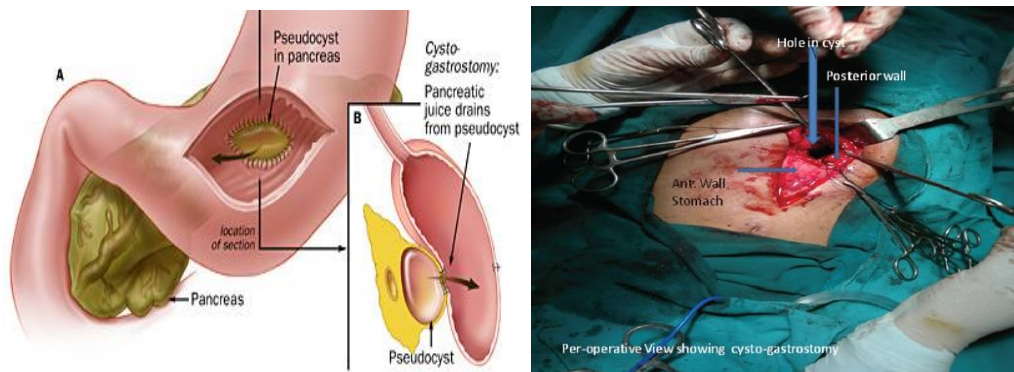
- Drainage through the skin using a needle, usually guided by a CT scan





- **Surgery (cystgastrostomy, cystjejunostomy, cystduodenostomy)**

Surgical drainage of the pseudocyst, which involves making a connection between the cyst and the stomach or small intestine to allow drainage of the fluid. This may be as an open surgery or done using a laparoscope.



Open cystgastrostomy

PANCREATIC CANCER

Cancer develops when cells grow in an uncontrolled manner and form masses or tumors in the pancreas, instead of growing into healthy pancreatic tissue, which may also spread to other parts of the body. Tumors can interfere with the functions of the pancreas and cause pain and other symptoms.



Risk factors.

- Cigarette smoking
- High fat and low-fiber diet
- Being overweight and obese.
- Exposure to industrial chemicals and toxic metals.

Signs & Symptoms.

Initially, pancreatic cancer tends to be silent and painless as it grows. By the time it's large enough to cause symptoms, pancreatic cancer has generally grown outside the pancreas. At this point, symptoms depend on the cancer's location within the pancreas.

- Pancreatic cancer in the head of the pancreas tends to cause symptoms such as weight loss, jaundice (yellow skin), dark urine, pale stool color, itching, nausea, vomiting, abdominal pain, back pain, and enlarged lymph nodes in the neck.
- Pancreatic cancer in the body or tail of the pancreas usually causes belly and/or back pain and weight loss.

As it grows and spreads, pancreatic cancer affects the whole body. Such symptoms can include:

- Weight loss
- Diarrhea
- Bloating
- Malaise
- Loss of appetite
- Elevated blood sugars. Some people with pancreatic cancer develop diabetes as the cancer impairs the pancreas' ability to produce insulin.

Diagnosis

If pancreatic cancer is suspected, several tests can be run to confirm the diagnosis and assess the situation:

1. Patient's History & Physical Examination.
2. Lab Tests

Some tumors are associated with specific proteins in the blood, called **tumor markers**. For pancreatic cancer, the tumor markers are CA 19-9 and CEA, and they can be identified through blood tests. Bilirubin levels may also be high in case of blockage of biliary ducts by the tumour.

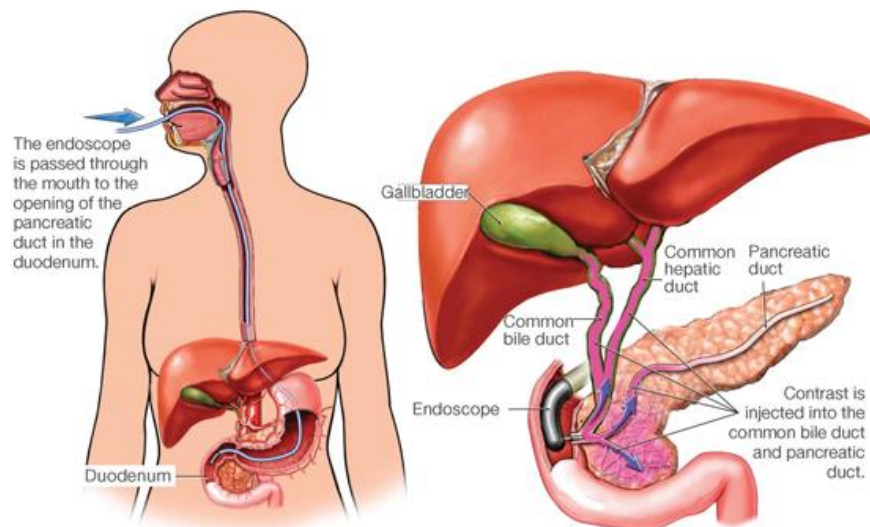
3. Imaging Tests

These tests allow you and your doctor to see what's going on in your pancreas and the surrounding organs. They help diagnose tumors and also monitor their growth over time.

These tests include:

- CT Scan: a series of high-resolution x-rays used to give a 3-D look at the body
- MRI: a 3-D look at the body using radio waves and magnets
- MRCP: an MRI that focuses on the pancreas and bile ducts
- PET Scan: a scan specifically designed to identify cancers
- Endoscopy:- the insertion of small, thin device called an endoscope, which is passed through the mouth and into your abdomen:
- Endoscopic Ultrasound (EUS)
- Endoscopic Retrograde Cholangiopancreatography (ERCP)

Endoscopic Retrograde Cholangiopancreatography



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4. Biopsy

This involves taking a tiny piece of the suspected tumor and looking at it under a microscope to confirm the presence of cancer cells. Biopsies give the most accurate diagnosis.

Depending on the location of the tumor and your personal health history, any of the following methods may be used to collect the biopsy:

- Fine Needle Aspiration, which involves inserting a thin needle into the pancreas. The needle can be inserted through an endoscope, or less commonly through the skin.
- Brush Biopsy, which involves using a small brush attached to an endoscope to gather cells in one of the ducts near the pancreas.

- Laparoscopy, which is a form of surgery in which doctors collect a piece of the tumor through small incisions in the abdomen.

Staging.

Staging enables a team of physicians to create the best treatment plan to extend survival and maintain quality of life.

Stage I Cancer is confined to the pancreas only.

Stage II Cancer has spread beyond the pancreas to the nearby tissue and may have spread to the lymph nodes.

Stage III Cancer has spread beyond the pancreas to the major blood vessels around the pancreas and may have spread to the lymph nodes.

Stage IV Cancer has spread to distant sites beyond the pancreas such as the liver, lungs and the lining surrounding the abdominal organs (peritoneum)

Treatment.

Five types of standard treatment are used:

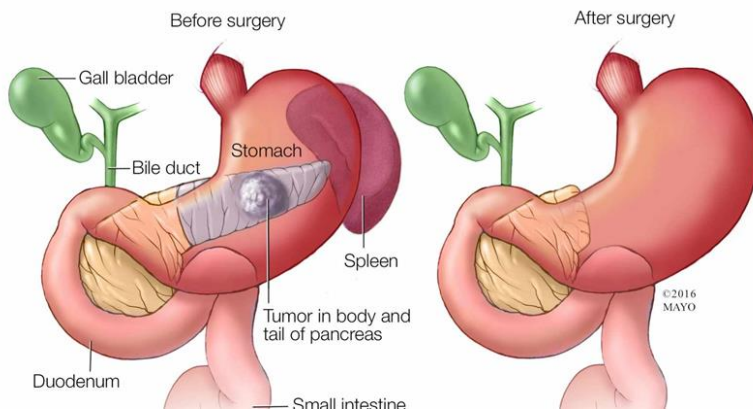
1. Surgery

Whipple procedure: A surgical procedure in which the head of the pancreas, the gallbladder, part of the stomach, part of the small intestine, and the bile duct are removed. Enough of the pancreas is left to produce digestive juices and insulin.

Total pancreatectomy: This operation removes the whole pancreas, part of the stomach, part of the small intestine, the common bile duct, the gallbladder, the spleen, and nearby lymph nodes.

Distal pancreatectomy: The body and the tail of the pancreas and usually the spleen are removed.

Distal pancreatectomy



If the cancer has spread and cannot be removed, the following types of palliative surgery (open or laparoscopic) may be done to relieve symptoms and improve quality of life:

Surgical biliary bypass: If cancer is blocking the small intestine and bile is building up in the gallbladder, a biliary bypass may be done. During this operation, the doctor will cut the gallbladder or bile duct and sew it to the small intestine to create a new pathway around the blocked area.

Endoscopic stent placement: If the tumor is blocking the bile duct, surgery may be done to put in a stent (a thin tube) to drain bile that has built up in the area.

Gastric bypass: If the tumor is blocking the flow of food from the stomach, the stomach may be sewn directly to the small intestine so the patient can continue to eat normally.



Laparoscopic surgery.

2. Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells or keep them from growing.

3. Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing.

4. Chemo radiation therapy

Chemo radiation therapy combines chemotherapy and radiation therapy to increase the effects of both.

5. Targeted therapy

Targeted therapy is a type of treatment that uses drugs or other substances to identify and attack specific cancer cells without harming normal cells.