

# Pancreatitis

*National Digestive Diseases Information Clearinghouse*



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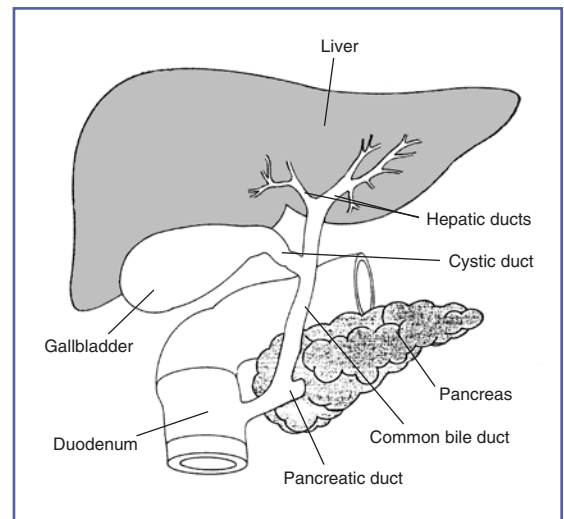
## What is pancreatitis?

Pancreatitis is inflammation of the pancreas. The pancreas is a large gland behind the stomach and close to the duodenum—the first part of the small intestine. The pancreas secretes digestive juices, or enzymes, into the duodenum through a tube called the pancreatic duct. Pancreatic enzymes join with bile—a liquid produced in the liver and stored in the gallbladder—to digest food. The pancreas also releases the hormones insulin and glucagon into the bloodstream. These hormones help the body regulate the glucose it takes from food for energy.

Normally, digestive enzymes secreted by the pancreas do not become active until they reach the small intestine. But when the pancreas is inflamed, the enzymes inside it attack and damage the tissues that produce them.

Pancreatitis can be acute or chronic. Either form is serious and can lead to complications. In severe cases, bleeding, infection, and permanent tissue damage may occur.

Both forms of pancreatitis occur more often in men than women.



The gallbladder and the ducts that carry bile and other digestive enzymes from the liver, gallbladder, and pancreas to the small intestine are called the biliary system.

## What is acute pancreatitis?

Acute pancreatitis is inflammation of the pancreas that occurs suddenly and usually resolves in a few days with treatment. Acute pancreatitis can be a life-threatening illness with severe complications. Each year, about 210,000 people in the United States are admitted to the hospital with acute pancreatitis.<sup>1</sup> The most common cause of acute pancreatitis is the presence of gallstones—small, pebble-like substances made of hardened bile—that cause inflammation in the pancreas as they pass through

<sup>1</sup>Russo MW, Wei JT, Thiny MT, et al. Digestive and liver disease statistics, 2004. *Gastroenterology*. 2004;126:1448–1453.

the common bile duct. Chronic, heavy alcohol use is also a common cause. Acute pancreatitis can occur within hours or as long as 2 days after consuming alcohol. Other causes of acute pancreatitis include abdominal trauma, medications, infections, tumors, and genetic abnormalities of the pancreas.

### Symptoms

Acute pancreatitis usually begins with gradual or sudden pain in the upper abdomen that sometimes extends through the back. The pain may be mild at first and feel worse after eating. But the pain is often severe and may become constant and last for several days. A person with acute pancreatitis usually looks and feels very ill and needs immediate medical attention. Other symptoms may include

- a swollen and tender abdomen
- nausea and vomiting
- fever
- a rapid pulse

Severe acute pancreatitis may cause dehydration and low blood pressure. The heart, lungs, or kidneys can fail. If bleeding occurs in the pancreas, shock and even death may follow.

### Diagnosis

While asking about a person's medical history and conducting a thorough physical examination, the doctor will order a blood test to assist in the diagnosis. During acute pancreatitis, the blood contains at least three times the normal amount of amylase and lipase, digestive enzymes formed in the pancreas. Changes may also occur in other body chemicals such as glucose, calcium, magnesium, sodium, potassium, and bicarbonate. After the person's condition improves, the levels usually return to normal.

Diagnosing acute pancreatitis is often difficult because of the deep location of the pancreas. The doctor will likely order one or more of the following tests:

- **Abdominal ultrasound.** Sound waves are sent toward the pancreas through a handheld device that a technician glides over the abdomen. The sound waves bounce off the pancreas, gallbladder, liver, and other organs, and their echoes make electrical impulses that create a picture—called a sonogram—on a video monitor. If gallstones are causing inflammation, the sound waves will also bounce off them, showing their location.

- **Computerized tomography (CT) scan.** The CT scan is a noninvasive x ray that produces three-dimensional pictures of parts of the body. The person lies on a table that slides into a donut-shaped machine. The test may show gallstones and the extent of damage to the pancreas.
- **Endoscopic ultrasound (EUS).** After spraying a solution to numb the patient's throat, the doctor inserts an endoscope—a thin, flexible, lighted tube—down the throat, through the stomach, and into the small intestine. The doctor turns on an ultrasound attachment to the scope that produces sound waves to create visual images of the pancreas and bile ducts.
- **Magnetic resonance cholangiopancreatography (MRCP).** MRCP uses magnetic resonance imaging, a noninvasive test that produces cross-section images of parts of the body. After being lightly sedated, the patient lies in a cylinder-like tube for the test. The technician injects dye into the patient's veins that helps show the pancreas, gallbladder, and pancreatic and bile ducts.

## Treatment

Treatment for acute pancreatitis requires a few days' stay in the hospital for intravenous (IV) fluids, antibiotics, and medication to relieve pain. The person cannot eat or drink so the pancreas can rest. If vomiting occurs, a tube may be placed through the nose and into the stomach to remove fluid and air.

Unless complications arise, acute pancreatitis usually resolves in a few days. In severe cases, the person may require nasogastric feeding—a special liquid given in a long, thin tube inserted through the nose and throat and into the stomach—for several weeks while the pancreas heals.

Before leaving the hospital, the person will be advised not to smoke, drink alcoholic beverages, or eat fatty meals. In some cases, the cause of the pancreatitis is clear, but in others, more tests are needed after the person is discharged and the pancreas is healed.

## Therapeutic Endoscopic Retrograde Cholangiopancreatography (ERCP) for Acute and Chronic Pancreatitis

ERCP is a specialized technique used to view the pancreas, gallbladder, and bile ducts and treat complications of acute and chronic pancreatitis—gallstones, narrowing or blockage of the pancreatic duct or bile ducts, leaks in the bile ducts, and pseudocysts—accumulations of fluid and tissue debris.

Soon after a person is admitted to the hospital with suspected narrowing of the pancreatic duct or bile ducts, a physician with specialized training performs ERCP.

After lightly sedating the patient and giving medication to numb the throat, the doctor inserts an endoscope—a long, flexible, lighted tube with a camera—through the mouth, throat, and stomach into the small intestine. The endoscope is connected to a computer and screen. The doctor guides the endoscope and injects a special dye into the pancreatic or bile ducts that helps the pancreas, gallbladder, and bile ducts appear on the screen while x rays are taken.

The following procedures can be performed using ERCP:

**Sphincterotomy.** Using a small wire on the endoscope, the doctor finds the muscle that surrounds the pancreatic duct or

bile ducts and makes a tiny cut to enlarge the duct opening. When a pseudocyst is present, the duct is drained.

**Gallstone removal.** The endoscope is used to remove pancreatic or bile duct stones with a tiny basket. Gallstone removal is sometimes performed along with a sphincterotomy.

**Stent placement.** Using the endoscope, the doctor places a tiny piece of plastic or metal that looks like a straw in a narrowed pancreatic or bile duct to keep it open.

**Balloon dilatation.** Some endoscopes have a small balloon that the doctor uses to dilate, or stretch, a narrowed pancreatic or bile duct. A temporary stent may be placed for a few months to keep the duct open.

People who undergo therapeutic ERCP are at slight risk for complications, including severe pancreatitis, infection, bowel perforation, or bleeding. Complications of ERCP are more common in people with acute or recurrent pancreatitis. A patient who experiences fever, trouble swallowing, or increased throat, chest, or abdominal pain after the procedure should notify a doctor immediately.

## Complications

Gallstones that cause acute pancreatitis require surgical removal of the stones and the gallbladder. If the pancreatitis is mild, gallbladder removal—called cholecystectomy—may proceed while the person is in the hospital. If the pancreatitis is severe, gallstones may be removed

using therapeutic endoscopic retrograde cholangiopancreatography (ERCP)—a specialized technique used to view the pancreas, gallbladder, and bile ducts and treat complications of acute and chronic pancreatitis. Cholecystectomy is delayed for a month or more to allow for full recovery. For more information, see the

*Gallstones* fact sheet from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).

If an infection develops, ERCP or surgery may be needed to drain the infected area, also called an abscess. Exploratory surgery may also be necessary to find the source of any bleeding, to rule out conditions that resemble pancreatitis, or to remove severely damaged pancreatic tissue.

Pseudocysts—accumulations of fluid and tissue debris—that may develop in the pancreas can be drained using ERCP or EUS. If pseudocysts are left untreated, enzymes and toxins can enter the bloodstream and affect the heart, lungs, kidneys, or other organs.

Acute pancreatitis sometimes causes kidney failure. People with kidney failure need blood-cleansing treatments called dialysis or a kidney transplant.

In rare cases, acute pancreatitis can cause breathing problems. Hypoxia, a condition that occurs when body cells and tissues do not get enough oxygen, can develop. Doctors treat hypoxia by giving oxygen to the patient. Some people still experience lung failure—even with oxygen—and require a respirator for a while to help them breathe.

## What is chronic pancreatitis?

Chronic pancreatitis is inflammation of the pancreas that does not heal or improve—it gets worse over time and leads to permanent damage. Chronic pancreatitis, like acute pancreatitis, occurs when digestive enzymes attack the pancreas and nearby tissues, causing episodes of pain. Chronic pancreatitis often develops in people who are between the ages of 30 and 40.

The most common cause of chronic pancreatitis is many years of heavy alcohol use. The chronic form of pancreatitis can be triggered by one acute attack that damages the pancreatic duct. The damaged duct causes the pancreas to become inflamed. Scar tissue develops and the pancreas is slowly destroyed.

Other causes of chronic pancreatitis are

- hereditary disorders of the pancreas
- cystic fibrosis—the most common inherited disorder leading to chronic pancreatitis
- hypercalcemia—high levels of calcium in the blood
- hyperlipidemia or hypertriglyceridemia—high levels of blood fats
- some medicines
- certain autoimmune conditions
- unknown causes

Hereditary pancreatitis can present in a person younger than age 30, but it might not be diagnosed for several years. Episodes of abdominal pain and diarrhea lasting several days come and go over time and can progress to chronic pancreatitis. A diagnosis of hereditary pancreatitis is likely if the person has two or more family members with pancreatitis in more than one generation.

## Symptoms

Most people with chronic pancreatitis experience upper abdominal pain, although some people have no pain at all. The pain may spread to the back, feel worse when eating or drinking, and become constant and disabling. In some cases, abdominal

pain goes away as the condition worsens, most likely because the pancreas is no longer making digestive enzymes. Other symptoms include

- nausea
- vomiting
- weight loss
- diarrhea
- oily stools

People with chronic pancreatitis often lose weight, even when their appetite and eating habits are normal. The weight loss occurs because the body does not secrete enough pancreatic enzymes to digest food, so nutrients are not absorbed normally. Poor digestion leads to malnutrition due to excretion of fat in the stool.

## Diagnosis

Chronic pancreatitis is often confused with acute pancreatitis because the symptoms are similar. As with acute pancreatitis, the doctor will conduct a thorough medical history and physical examination. Blood tests may help the doctor know if the pancreas is still making enough digestive enzymes, but sometimes these enzymes appear normal even though the person has chronic pancreatitis.

In more advanced stages of pancreatitis, when malabsorption and diabetes can occur, the doctor may order blood, urine, and stool tests to help diagnose chronic pancreatitis and monitor its progression.

After ordering x rays of the abdomen, the doctor will conduct one or more of the tests used to diagnose acute pancreatitis—abdominal ultrasound, CT scan, EUS, and MRCP.

## Treatment

Treatment for chronic pancreatitis may require hospitalization for pain management, IV hydration, and nutritional support. Nasogastric feedings may be necessary for several weeks if the person continues to lose weight.

When a normal diet is resumed, the doctor may prescribe synthetic pancreatic enzymes if the pancreas does not secrete enough of its own. The enzymes should be taken with every meal to help the person digest food and regain some weight. The next step is to plan a nutritious diet that is low in fat and includes small, frequent meals. A dietitian can assist in developing a meal plan. Drinking plenty of fluids and limiting caffeinated beverages is also important.

People with chronic pancreatitis are strongly advised not to smoke or consume alcoholic beverages, even if the pancreatitis is mild or in the early stages.

## Complications

People with chronic pancreatitis who continue to consume large amounts of alcohol may develop sudden bouts of severe abdominal pain.

As with acute pancreatitis, ERCP is used to identify and treat complications associated with chronic pancreatitis such as gallstones, pseudocysts, and narrowing or obstruction of the ducts. Chronic pancreatitis also can lead to calcification of the pancreas, which means the pancreatic tissue hardens from deposits of insoluble calcium salts. Surgery may be necessary to remove part of the pancreas.

In cases involving persistent pain, surgery or other procedures are sometimes recommended to block the nerves in the abdominal area that cause pain.

When pancreatic tissue is destroyed in chronic pancreatitis and the insulin-producing cells of the pancreas, called beta cells, have been damaged, diabetes may develop. People with a family history of diabetes are more likely to develop the disease. If diabetes occurs, insulin or other medicines are needed to keep blood glucose at normal levels. A health care provider works with the patient to develop a regimen of medication, diet, and frequent blood glucose monitoring.

For more information about diabetes, see the booklet *Your Guide to Diabetes: Type 1 and Type 2* from the NIDDK.

## How common is pancreatitis in children?

Chronic pancreatitis in children is rare. Trauma to the pancreas and hereditary pancreatitis are two known causes of childhood pancreatitis. Children with cystic fibrosis—a progressive and incurable lung disease—may be at risk of developing pancreatitis. But more often the cause of pancreatitis in children is unknown.

## Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases' Division of Digestive Diseases and Nutrition supports basic and clinical research into gastrointestinal diseases, including the causes of pancreatitis and cell injury in the gastrointestinal tract. In addition, researchers are studying the genetics of hereditary pancreatitis and risk factors such as cystic fibrosis.

Participants in clinical trials can play a more active role in their own health care, gain access to new research treatments before they are widely available, and help others by contributing to medical research. For information about current studies, visit [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).

## Points to Remember

- Pancreatitis is inflammation of the pancreas, causing digestive enzymes to become active inside the pancreas and damage pancreatic tissue.
- Pancreatitis has two forms: acute and chronic.
- Common causes of pancreatitis are gallstones and heavy alcohol use.
- Sometimes the cause of pancreatitis cannot be found.
- Symptoms of acute pancreatitis include abdominal pain, nausea, vomiting, fever, and a rapid pulse.
- Treatment for acute pancreatitis includes intravenous (IV) fluids, antibiotics, and pain medications. Surgery is sometimes needed to treat complications.
- Acute pancreatitis can become chronic if pancreatic tissue is permanently destroyed and scarring develops.
- Symptoms of chronic pancreatitis include abdominal pain, nausea, vomiting, weight loss, diarrhea, and oily stools.
- Treatment for chronic pancreatitis may involve IV fluids; pain medication; a low-fat, nutritious diet; and enzyme supplements. Surgery may be necessary to remove part of the pancreas.

## For More Information

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### American Gastroenterological Association

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You may also find additional information about this topic by

- searching the NIDDK Reference Collection at [www.catalog.niddk.nih.gov/resources](http://www.catalog.niddk.nih.gov/resources)
- visiting MedlinePlus at [www.medlineplus.gov](http://www.medlineplus.gov)

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