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# What are gallstones?

Gallstones are pieces of hard, solid matter that form over time in the gallbladder of some people.

The gallbladder sits under the liver and stores bile (a key digestive "juice"). Gallstones form when the parts of bile — such as cholesterol and bilirubin — form crystals, much as sugar may collect in the bottom of a syrup jar.

A person can have a single gallstone or hundreds, and these can differ in size from very small (like a grain of sand) to more than one inch (like a golf ball).

Sometimes the gallbladder has only crystals and stones too small to see with the naked eye. This is called biliary sludge.

Almost one million Americans are found to have gallstones (gallstone disease) each year.

There are many ways to treat gallstones, with the most common being to remove the gallbladder. Many people with gallstones have no symptoms.

Often, gallstones are found when a test is done to look at some other problem. So-called silent gallstones are likely to remain silent, and usually no treatment is needed.

## The gallbladder

- The gallbladder is a sac about the size and shape of a pear that lies under the liver in the upper right-hand part of your abdomen.
- It is joined to the liver and the intestine by a series of small tubes, or ducts.
- The main job of the gallbladder is to store bile, which is made and secreted continuously by the liver, until the bile is needed to aid in digestion.

- After a meal, the gallbladder contracts and bile flows into the intestine.
- When digestion of the meal is over, the gallbladder relaxes and once again starts to store bile.

### Bile

- Bile is a yellow-brown liquid made from bile salts, cholesterol, bilirubin and lecithin.
- The liver makes about three cups of bile each day.
- Some parts of the bile, such as bile salts and lecithin, act like detergents to break up fat so that it can be easily digested.
- Others, like bilirubin, are waste products. Bilirubin is a dark-brown substance that gives a brown color to bile and stool.

## Symptoms of gallstones

The most typical symptoms of gallstones (gallstone disease) is intermittent pain in the upper abdomen, usually on the right side or centrally.

- The pain may be severe.
- The pain may last for as little as 15 minutes or as long as several hours.
- The pain may also be felt between the shoulder blades or in the right shoulder.

Sometimes patients also have vomiting or sweating.

The pain often starts after eating, but may awaken you from sleep.

Attacks of gallstone pain may be separated by weeks, months or even years.

## Causes of gallstones

It is not fully known why some people get gallstones and others don't.

### There are certain things that are known to raise the chances of getting gallstones:

- A greater amount of cholesterol or bilirubin in bile.
- Hormones or medications that result in decreased emptying of the gallbladder.
- Obesity.
- Not having an active lifestyle.
- Being female.

- Being over 40 years old.
- Diabetes.
- Liver disease.
- Family history of gallstones.

### Pigment (bilirubin) gallstones are found most often in:

- Patients with severe liver disease.
- Patients with some blood diseases, such as sickle cell anemia and leukemia.

### Cholesterol gallstones are more common and found most often in:

- Women over 20 years of age.
- Pregnant women.
- Men over 60 years of age.
- Overweight men and women.
- People on “crash diets” who lose a lot of weight quickly.
- People who use certain medications, such as birth control pills and cholesterol-lowering agents.
- Native Americans and Hispanics of Mexican origin.

## Getting tested for gallstones

When gallstones are suspected, routine liver blood tests are helpful since bile flow may be blocked and bile may back up into the liver.

### The best tests to find stones in the bile duct:

- Magnetic resonance imaging (MRI) scans.
- Endoscopic ultrasound, or EUS (which uses a small ultrasound probe at the tip of a long, thin, flexible tube [endoscope] passed into the stomach).
- Endoscopic retrograde cholangiopancreatography, or ERCP (X-ray dye injected into the bile duct through an endoscope passed through the mouth).

These tests may carry some risk. It is important to talk to your gastroenterologist about which test is best for you.

### Other tests your doctor may do are:

### + Abdominal ultrasound

Most often used to find gallstones and determine if the gallbladder is inflamed. a special tool is used to bounce sound waves against hard objects, like stones.

Ultrasound is about 95 percent effective in finding gallstones; still, it is not very accurate in figuring out if a stone has passed out of the gallbladder into the bile duct (tube that carries bile).

### + Cholescintigraphy, or Hepatobiliary (HIDA), scan

A radioactive tracer is injected into a vein, taken up by the healthy liver and excreted — passed into the bile and healthy gallbladder.

This exam can help find out if the cystic duct of the gallbladder is obstructed and how well the gallbladder contracts.

### + Computerized tomography (CT) scan

May find gallstones but is less accurate than abdominal ultrasound.

## Treatment for gallstones

When gallstones are not causing symptoms, treatment is usually not needed. When there are symptoms suggestive of gallstone disease and tests show gallstones, the common course of action is surgery to remove the gallbladder.

### + Laparoscopic cholecystectomy (surgery to remove gallbladder)

- This is minimally invasive surgery to remove, or take out, the gallbladder.
- You can often go home from the hospital within a day and go back to normal activities within a few days after this surgery.
- This surgery has become common and is now used for more than 90 percent of all gallbladder removals in the U.S.
- This type of surgery cannot be used in all cases, though. It may be too hard or unsafe to take out a severely inflamed gallbladder and an open surgery may be necessary (resulting in a larger scar and slower recovery).
- Bile duct injury is the most common complication of surgical removal of the gallbladder.

### + Endoscopic retrograde cholangiopancreatography (ERCP)

- As described in the testing section, ERCP can be used to find and remove stones in the common bile duct.
- When duct stones are seen, the doctor can widen the bile duct opening and pull the stones into the intestine.
- This is often done shortly before or after surgery to remove the gallbladder if a stone is suspected or found in the bile duct.
- Stones may sometimes be found in the common bile duct long after the gallbladder has been removed.

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+ **Dissolving stones**

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- Gallbladder stones can sometimes be dissolved by a chemical (ursodiol or chenodiol), which comes in pill form. This medicine thins the bile and slowly helps stones dissolve (break apart).
- Unfortunately, only small stones made from cholesterol dissolve, so the chemical's use is only for patients with the right size and type of stones. After successful dissolution, stones may return in the future in many patients.

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## Complications of gallstones

It is thought that gallstone pain happens when a stone blocks the duct that drains the gallbladder (cystic duct).

If the stone continues to block the cystic duct for many hours, the gallbladder may become inflamed. This condition is called acute cholecystitis and may lead to:

- Fever.
- Pain.
- Infection of the gallbladder.
- Hospitalization involving treatment with antibiotics, pain medications and often surgery.

More serious complications may happen when a gallstone passes out of the gallbladder duct and into the main bile duct. Stones in the common bile duct often cause:

- Pain.
- Fever.
- Jaundice (when your skin and/or the whites of your eyes turn yellow).
- Itching (sometimes).
- Serious bile duct infection.
- Pancreatitis.