



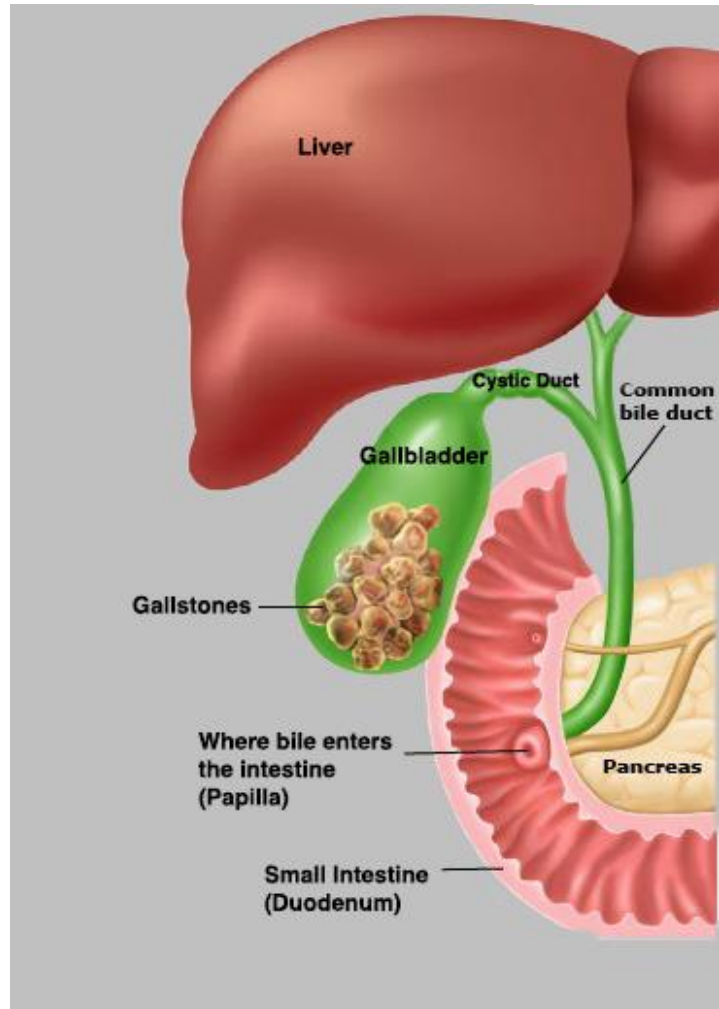
## Gallstones and the Trouble They Cause

What is the gallbladder?

Your digestive tract, or system, works 24/7 to nourish your body by processing everything you eat. Food is composed of large molecules of carbohydrates, proteins, and fats that are too big to be absorbed into your body. As food moves through your gut, it is broken down into smaller components so that your body can better absorb the nutrients. Pancreas enzymes can break down carbohydrates and proteins, but it's your liver that reduces the fat molecules in your diet by producing a brownish digestive fluid called bile. Liver bile converts the dietary fat into smaller molecules that can be more easily absorbed into your bloodstream as fuel for energy, growth, and repair.

The organs of your digestive tract work very efficiently. Your liver makes bile continuously, but since you only need bile when eating, precious excess bile is moved to the gallbladder for storage between meals. Your gallbladder is a pear-shaped organ located beneath your liver in the upper right abdomen. While the stored bile waits for your next meal, the gallbladder distills it, increasing its effectiveness. During a meal, the gallbladder contracts to inject the concentrated bile into the small intestine, where it is used to complete the breakdown of that greasy cheeseburger.

Bile is transported from your liver to the intestine, via your gallbladder, through a series of hollow connecting tubes. These tubes are called bile ducts. The main or common bile duct connects the liver directly to a small nipple in the duodenal wall called the papilla. As you eat, bile drains from the papilla into the duodenum, or small intestine, along with pancreatic enzymes (The main pancreas duct shares the papilla). The gallbladder is connected to the main bile duct by the cystic duct. (See illustration)



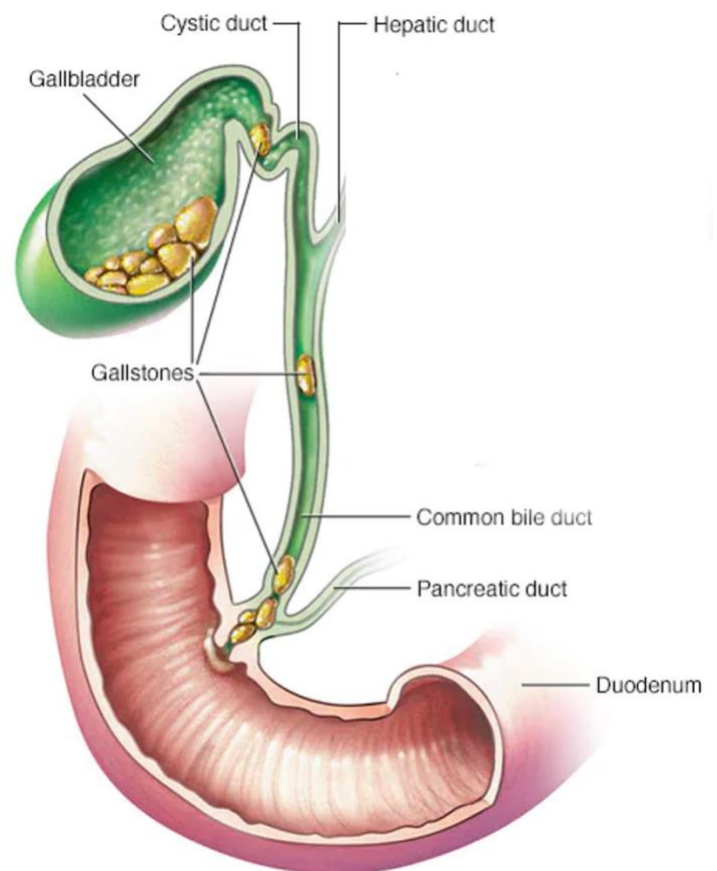
## Gallstones

If your gallbladder is not functioning properly, the stored liver bile may transform into tiny crystals. Like snowflakes make snowballs, these crystals can form a hard gallstone. Gallstones can be as small as a grain of sand or as large as a golf ball. Why this happens is unclear, but studies show that women are two times more likely than men to be affected and that the problem increases with age: about 10% of adult Americans have gallstones in their gallbladder. Most people have no symptoms and are unaware of their existence until diagnosed incidentally during a routine abdominal x-ray examination.



### Here comes trouble

Gallstones do not go away on their own, and if they stay in the gallbladder, they seldom cause trouble. However, if a gallstone escapes from the gallbladder and blocks the bile ducts, it may cause intense pain called biliary colic. A gallstone in the common bowel duct is called choledocholithiasis and can result in either intermittent or constant discomfort. The pain of choledocholithiasis is usually felt in the upper abdomen and can radiate to the right shoulder. Gallstone attacks can also manifest as chest pain that may feel like a heart attack. Inflammation of the gallbladder (cholecystitis), infected material trapped in the common bowel duct (cholangitis), or a gallstone blocking the outflow of the pancreas juice (gallstone pancreatitis) can result in fever, chills, and severe abdominal pain, or jaundice. Individuals with any of these complaints should have an urgent evaluation by a physician.



### How your doctor knows

Gallstones that are not causing adverse symptoms generally do not require further evaluation. Gallstones are often found by chance upon a routine abdominal x-ray or ultrasound examination. Unless complications of pain, nausea, vomiting, or fever are present, additional testing or intervention may not be needed.

If symptoms do occur, an accurate diagnosis is the first step and starts with a standard history and physical examination. The diagnosis of gallstones is suspected when symptoms of right upper quadrant abdominal pain or tenderness, nausea or vomiting, and abnormally high liver function blood tests are present. An abdominal ultrasound examination is the most common procedure for diagnosing gallstones in the gallbladder or common bile duct. It is quick, accurate, relatively inexpensive, and more accurate than a CT scan which only sees calcified gallstones.

Treatment depends on the situation.

The recommended treatment for gallstones obstructing the common bile duct is Endoscopic retrograde cholangiopancreatography (ERCP) or surgery. After sedation, ERCP is performed on a patient by inserting a flexible scope down through the mouth and into the duodenum to evaluate the condition of the common bowel duct or pancreatic duct. Tiny tubes and additional instruments may be used during the procedure to assess the ducts further and remove stones through the papilla.

Gallbladder surgery may be necessary if stones are found in the gallbladder itself, as these cannot be removed by ERCP. The operation, known as cholecystectomy, is frequently completed with minimally invasive surgery using a laparoscope inserted into the abdomen through several small incisions under general anesthesia. The stones can be removed via ERCP before or after cholecystectomy (or surgically at the time of cholecystectomy).

Cholecystectomy is a universally standard operation that has been successfully performed in over 600,000 cases per year in the United States. Early cholecystectomy is particularly important in poorly managed diabetics and those with a suppressed immune system as they may be more susceptible to severe cholangitis.

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#### Tests Used to Evaluate Gallstone Disease

1. Ultrasound – This test uses sound waves to examine the bile ducts, liver, and pancreas. It is not invasive and is very safe. Stones may be seen in the gallbladder or bile ducts. Imaging may be impaired in patients who are obese or have recently eaten food.



2. HIDA scan – a HIDA (hydroxyiminodiacetic acid) is a test of gallbladder function and bile duct obstruction. In a fasting state, a harmless radionucleotide material is injected into the bloodstream, carried to the liver, and concentrated in the gallbladder, making it visible. The volume of the gallbladder can be measured. The patient is given CCK hormone or a small meal to trick the gallbladder into thinking that the patient just had breakfast. Normally, with breakfast, the gallbladder should contract and release at least 35% of its volume, and the tracer should enter the bile ducts and flow unobstructed into the small intestine. If the ejected portion is much less than 35% or the tracer does not enter the small intestine, gallbladder disease and possible bile duct blockages may be present.
3. Endoscopic Ultrasound – This device uses a unique scope with an ultrasound probe. The scope is passed down into the small intestines, where internal ultrasound images of the bile ducts, gallbladder, and pancreas can be obtained. The use of the endoscopic ultrasound device requires special training. It helps locate bile duct stones that may be missed by routine ultrasound. It is also helpful in diagnosing cancers within the pancreas and bile ducts.
4. CT scan helps diagnose cancers within the liver and pancreas. It may identify gallstones but is not as effective in finding them as ultrasound. It is one of the best tests to assess the severity of pancreatitis.
5. ERCP – (Endoscopic Retrograde Cholangiopancreatography). This particular endoscope allows access to the bile ducts and pancreas ducts. It also allows therapy to be performed, such as removing stones from the bile ducts or pancreas ducts.
6. MRCP - (Magnetic Resonance Cholangiopancreatography). This test uses a machine called MRI (Magnetic Resonance Imaging). It is a noninvasive test that employs special computer software to create images of the bile and pancreatic ducts similar to the

images obtained by ERCP and does not require endoscopy. Abnormalities found on MRCP can be further evaluated or treated by ERCP or surgery.

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## **Center For Digestive Health & Nutrition**

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The Center for Digestive Health & Nutrition is a private medical practice comprised of experienced Gastroenterologists, Nurse Practitioners, and staff members dedicated to preventing and treating digestive disorders. Our physicians have been serving the needs of those in Western Pennsylvania and surrounding areas since 1977, having cared for tens of thousands of individuals with digestive problems. Our mission is to deliver high-quality gastroenterology services efficiently and cost-consciously. We realize the very sensitive nature of GI illness and understand the necessity to provide our services in an environment that stresses patient privacy and confidentiality and where patient satisfaction is the goal. Appointments can be conveniently scheduled online via our website above. Learn more about digestive issues on Instagram @thedigestivetract

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