

understanding
GALLSTONES

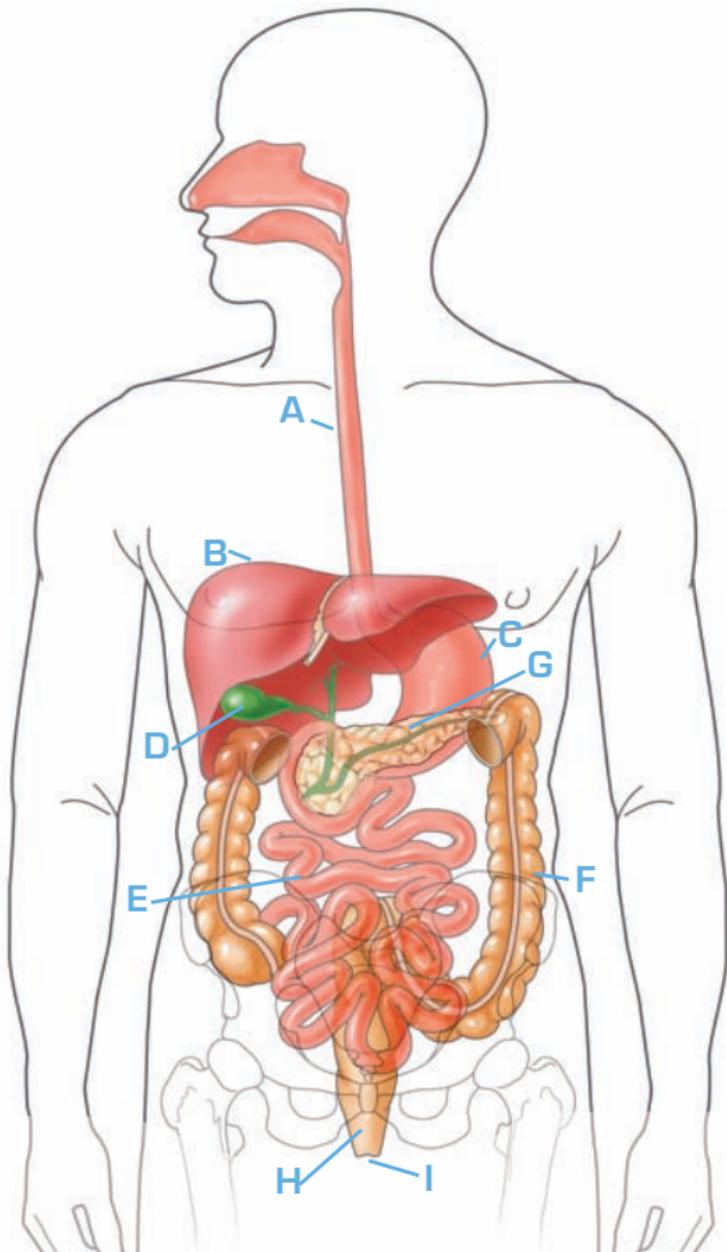
A patient's guide from your doctor and



Gallstone Basics

- The gallbladder sits beneath the liver and stores bile (a key digestive “juice”).
- Gallstones are crystallized pieces of bile, which can range in size from microscopic to more than one inch.
- Almost 1 million Americans are diagnosed with gallstone disease each year.
- A variety of treatment options are available, with the most common being cholecystectomy.

Your Digestive System



A. Esophagus

B. Liver

C. Stomach

D. Gallbladder

E. Small Intestine

F. Large Intestine

G. Pancreas

H. Rectum

I. Anus



To help you understand and manage your condition, the AGA Institute provides you with the following information, designed to give you some basic facts, to help you better understand your condition and to serve as a starting point for discussions with your doctor.

Gallstones

Gallstone disease is a common medical problem, affecting 10 percent to 15 percent of the population of the U.S., or well over 25 million people. Nearly 1 million new cases of gallstone disease are diagnosed every year in this country. Approximately one-quarter of these require treatment, with a cost to society of several billion dollars annually. In recent years, important advances have been made in the understanding of gallstone disease and in the development of new treatments.

The Gallbladder

The gallbladder is a sac, about the size and shape of a pear, which lies on the undersurface of the liver in the upper right-hand portion of the abdominal cavity. It is connected to the liver and the intestine by a series of small tubes, or ducts. The primary job of the gallbladder is to store bile, which is produced 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 begins to store bile.

Bile is a brown liquid which contains bile salts, cholesterol, bilirubin and lecithin. About 3 cups of bile are produced by the liver every day. Some substances in bile, including 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 which gives a brown color to bile and stool.

Gallstones & How They Form

Gallstones are pieces of hard solid matter in the gallbladder. They form when the components of bile — including cholesterol and bilirubin — precipitate out of solution and form crystals, much as sugar may collect in the bottom of a syrup jar. In the U.S., almost 80 percent of patients with gallstones have cholesterol stones.

Gallstones may be as small as a grain of sand or as large as a golf ball, and the gallbladder may contain anywhere from one stone to hundreds. Sometimes the gallbladder contains only crystals and stones too small to see with the naked eye. This condition is called **biliary sludge**.

It is not entirely known why some people develop gallstones and others don't; however, certain factors are known to increase the likelihood of developing gallstones:

- ▶ An increased amount of cholesterol or bilirubin in bile
- ▶ Poor contraction of the gallbladder muscle with incomplete emptying of the gallbladder
- ▶ Obesity
- ▶ Sedentary lifestyle
- ▶ Female gender
- ▶ Age over forty 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 disorders such as sickle cell anemia and leukemia.

Cholesterol gallstones are found most often in:

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

Gallstone Symptoms

Many people with gallstones have no symptoms. Often the gallstones are found when a test is performed to evaluate some other problem. So-called “**silent gallstones**” are likely to remain silent, and no treatment is recommended.

The most typical symptom of gallstone disease is severe steady pain in the upper abdomen or right side. 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. Attacks of gallstone pain may be separated by weeks, months or even years.

Gallstone Complications

It is thought that gallstone pain results from blockage of the gallbladder duct (cystic duct) by a stone. When the blockage is prolonged (greater than several hours), the gallbladder may become inflamed. This condition, called **acute cholecystitis**, may lead to fever, prolonged pain and eventually infection of the gallbladder. Hospitalization is usually necessary for observation, for treatment with antibiotics and pain medications, and frequently for surgery.

More serious complications may occur when a gallstone passes out of the gallbladder duct and into the main bile duct. If the stone lodges in the main bile duct, it can lead to a serious bile duct infection. If it passes down the bile duct, it can cause an inflammation of the pancreas, which has a common drainage channel with the bile duct. Either of these situations can be extremely dangerous. Stones in the bile duct usually cause pain, fever and jaundice (yellow discoloration of the eyes and skin) sometimes accompanied by itching.

Tests Used to Diagnose Gallstones

The most important parts of any diagnostic process are the patient’s description of symptoms and the doctor’s physical examination. When gallstones are suspected, routine liver blood tests are helpful since bile flow may be blocked and bile may back up into the liver.

- ▶ **Abdominal ultrasound:** Most commonly used to determine the presence of gallstones. A special instrument is used to bounce sound waves against hard objects like stones. Ultrasound is approximately 95 percent effective in diagnosing gallstones; however, it is not very accurate in determining if a stone has passed out of the gallbladder into the bile duct.
- ▶ **Cholescintigraphy, or HIDA scan:** A radioactive tracer is injected into a vein, taken up by the liver and excreted, or eliminated, into the bile. This exam can help determine how well the gallbladder contracts in addition to giving information about whether stones are present within the cystic or common bile ducts.
- ▶ **CT scans:** May detect gallstones; however, are less accurate than abdominal ultrasound.

The most accurate tests to identify stones in the bile duct include:

- ▶ **Magnetic resonance imaging** (MRI) scans.
- ▶ **Endoscopic ultrasound** or EUS (which utilizes a small ultrasound probe at the tip of an 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 small risks. It is important to talk to your gastroenterologist about which test is most appropriate for you.

Treatments for Gallstones

When gallstones are not causing symptoms, treatment is usually unnecessary.

Surgical removal of the gallbladder (**cholecystectomy**) is the most widely used therapy when symptoms have arisen from gallstones. Patients generally do well after surgery and have no difficulty with digesting food, even though the gallbladder's function is to aid digestion.

In laparoscopic cholecystectomy, the surgeon makes several incisions in the abdomen through which a tiny video camera and surgical instruments are passed. The video picture is viewed in the operating room on a TV screen, and the gallbladder can be removed by manipulating the surgical instruments. Because the abdominal muscles are not cut, there is less postoperative pain, quicker healing and better cosmetic results. The patient usually can go home from the hospital within a day and resume normal activities within a few days.

Laparoscopic cholecystectomy has become common and is now used for more than 90 percent of all gallbladder removals in the U.S. However, it cannot be used in all cases. For instance, it may be difficult or dangerous to remove a severely inflamed gallbladder laparoscopically. It may also be more difficult to remove a stone from the bile duct laparoscopically, if one is found at surgery to have passed out of the gallbladder and into the duct. However, stones in the bile duct can frequently be removed with ERCP.

Gallbladder surgery may be complicated by injury to the bile duct, leading either to leakage of bile or scarring and blockage of the duct. Mild cases can frequently be treated without surgery, but severe injury generally requires bile duct surgery. Bile duct injury is the most common complication of laparoscopic cholecystectomy.

Alternatives to Cholecystectomy

There are alternatives to surgery for both stones in the gallbladder and stones in the bile duct.

Endoscopic retrograde cholangiopancreatography (ERCP) can be used to find and remove stones in the bile duct, as described under “Tests.”

When duct stones are seen, the doctor can widen the bile duct opening and pull the stones into the intestine. This is commonly performed shortly before or after laparoscopic gallbladder removal if a stone is suspected or identified in the bile duct. Stones may occasionally be identified in the common bile duct long after the gallbladder has been removed.

Gallbladder stones can sometimes be dissolved by a chemical (ursodiol or chenodiol), which is available in pill form. This medicine thins the bile and allows stones to dissolve. Unfortunately, only small stones composed of cholesterol dissolve rapidly and completely and its use is therefore limited to patients with the right size and type of stones.



Go to www.gastro.org/patient for more information on digestive health and tests performed by gastroenterologists and to find an AGA member physician in your area.

The American Gastroenterological Association (AGA) is dedicated to the mission of advancing the science and practice of gastroenterology. Founded in 1897, the AGA is one of the oldest medical-specialty societies in the U.S. Our 16,000 members include physicians and scientists who research, diagnose and treat disorders of the gastrointestinal tract and liver. The AGA Institute runs the organization's practice, research and educational programs.

The content in the series of AGA Institute patient education brochures was reviewed by the following gastroenterologists:

John I. Allen, MD, MBA, AGAF

*Minnesota Gastroenterology
Chair, AGA Clinical Practice & Quality
Management Committee*

Harry R. Aslanian, MD

Yale University School of Medicine

Stephen J. Bickston, MD, AGAF

University of Virginia Health System

Joel V. Brill, MD, AGAF

*Predictive Health LLC
Chair, AGA Practice Management
& Economics Committee*

Marcia I. Canto, MD, MHS

Johns Hopkins University

Richard Davis, Jr. PA-C

University of Florida College of Medicine

Mark H. DeLegge, MD, AGAF

Medical University of South Carolina

Kenneth DeVault, MD

Mayo Clinic, Jacksonville

Stephen W. Hiltz, MD, MBA, AGAF

TriState Gastroenterology

Lawrence R.

Kosinski, MD, MBA, AGAF

Elgin Gastroenterology, S.C.

Linda A. Lee, MD, AGAF

Johns Hopkins School of Medicine

Stephen A. McClave, MD, AGAF

University of Louisville School of Medicine

Kimberley Persley, MD

Texas Digestive Disease Consultants

John Schaffner, MD

Mayo Clinic, Rochester

Joanne A.P. Wilson, MD, FACP, AGAF

Duke University Medical Center

Cynthia M. Yoshida, MD, AGAF

University of Virginia Health System

Atif Zaman, MD, MPH

Oregon Health and Science University



AGAINSTITUTE
AGA Education, Practice and Research



The Digestive Health Initiative® (DHI) is an AGA Institute initiative that offers educational programs on digestive disorders for individuals who are affected by a digestive disease, in an effort to educate the larger health-care community.

This brochure was produced by the AGA Institute and funded by a grant from Takeda Pharmaceuticals North America, Inc.



For more information about digestive diseases,
please visit the AGA Web site at www.gastro.org.

The AGA Institute offers the information in these brochures for educational purposes to provide accurate and helpful health information for the general public. This information is not intended as medical advice and should not be used for diagnosis. The information in these brochures should not be considered a replacement for consultation with a health-care professional. If you have questions or concerns about the information found in these brochures, please contact your health-care provider. We encourage you to use the information and questions in these brochures with your health-care provider(s) as a way of creating a dialogue and partnership about your condition and your treatment.