

Gallstones

National Digestive Diseases Information Clearinghouse



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The gallbladder is a small pear-shaped organ located beneath the liver on the right side of the abdomen. The gallbladder's primary functions are to store and concentrate bile, and secrete bile into the small intestine at the proper time to help digest food.

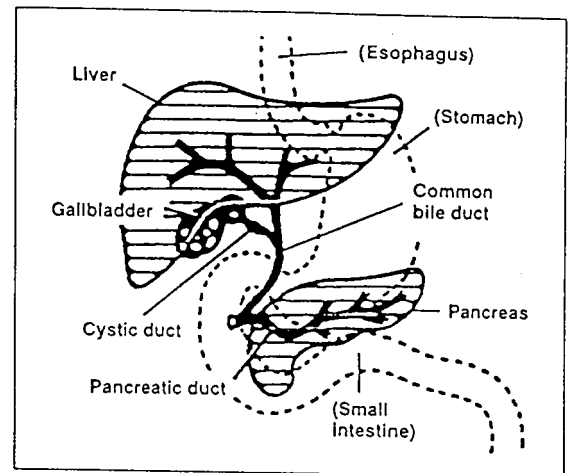
The gallbladder is connected to the liver and the small intestine by a series of ducts, or tube-shaped structures, that carry bile. Collectively, the gallbladder and these ducts are called the biliary system.

Bile is a yellow-brown fluid produced by the liver. In addition to water, bile contains cholesterol, lipids (fats), bile salts (natural detergents that break up fat), and bilirubin (the bile pigment that gives bile and stools their color). The liver can produce as much as three cups of bile in 1 day, and at any one time, the gallbladder can store up to a cup of concentrated bile.

As food passes from the stomach into the small intestine, the gallbladder contracts and sends its stored bile into the small intestine through the common bile duct. Once in the small intestine, bile helps digest fats in foods. Under normal circumstances, most bile is recirculated in the digestive tract by being absorbed in the intestine and returning to the liver in the bloodstream.

What Are Gallstones?

Gallstones are pieces of solid material that form in the gallbladder. Gallstones form when substances in the bile, primarily cholesterol and bile pigments, form hard, crystal-like particles.



Cholesterol stones are usually white or yellow in color and account for about 80 percent of gallstones. They are made primarily of cholesterol.

Pigment stones are small, dark stones made of bilirubin and calcium salts that are found in bile. They account for the other 20 percent of gallstones. Risk factors for pigment stones include cirrhosis, biliary tract infections, and hereditary blood cell disorders, such as sickle cell anemia.

Gallstones vary in size and may be as small as a grain of sand or as large as a golf ball. The gallbladder may develop a single, often large, stone or many smaller ones, even several thousand.

What Causes Gallstones?

Progress has been made in understanding the process of gallstone formation. Researchers believe that gallstones may be

What Problems Can Occur?

A gallstone attack usually is marked by a steady, severe pain in the upper abdomen. Attacks may last only 20 or 30 minutes but more often they last for one to several hours. A gallstone attack may also cause pain in the back between the shoulder blades or in the right shoulder and may cause nausea or vomiting. Attacks may be separated by weeks, months, or even years. Once a true attack occurs, subsequent attacks are much more likely.

Sometimes gallstones may make their way out of the gallbladder and into the cystic duct, the channel through which bile travels from the gallbladder to the small intestine. If stones become lodged in the cystic duct and block the flow of bile, they can cause cholecystitis, an inflammation of the gallbladder. Blockage of the cystic duct is a common complication caused by gallstones.

A less common but more serious problem occurs if the gallstones become lodged in the bile ducts between the liver and the intestine. This condition can block bile flow from the gallbladder and liver, causing pain and jaundice. Gallstones may also interfere with the flow of digestive fluids secreted from the pancreas into the small intestine, leading to pancreatitis, an inflammation of the pancreas.

Prolonged blockage of any of these ducts can cause severe damage to the gallbladder, liver, or pancreas, which can be fatal. Warning signs include fever, jaundice, and persistent pain.

How Are Gallstones Diagnosed?

Many times gallstones are detected during an abdominal x-ray, computerized axial tomography (CT) scan, or abdominal ultrasound that has been taken for an unrelated problem or complaint.

When actually looking for gallstones, the most common diagnostic tool is ultrasound. An ultrasound examination, also known as ultrasonography, uses sound waves. Pulses of sound waves are sent into the abdomen to create an image of the gallbladder. If stones are present, the sound waves will bounce off the stones, revealing their location.

Ultrasound has several advantages. It is a noninvasive technique, which means nothing is injected into or penetrates the body. Ultrasound is painless, has no known side effects, and does not involve radiation.

How Are Gallstones Treated? Surgery

Despite the development of nonsurgical techniques, gallbladder surgery, or cholecystectomy, is the most common method for treating gallstones. Each year more than 500,000 Americans have gallbladder surgery. Surgery options include the standard procedure called open cholecystectomy, and a less invasive procedure, called laparoscopic cholecystectomy.

The standard cholecystectomy is a major abdominal surgery in which the surgeon removes the gallbladder through a 5-to 8-inch incision. Patients may remain in the hospital about a week and may require several additional weeks to recover at home.

Laparoscopic cholecystectomy is a new alternative procedure for gallbladder removal. Some 15,000 surgeons have received training in the technique since its introduction in the United States in 1988. Currently about 80 percent of cholecystectomies are performed using laparoscopes.

Laparoscopic cholecystectomy requires several small incisions in the abdomen to allow the insertion of surgical instruments and a small video camera. The camera

caused by a combination of factors, including inherited body chemistry, body weight, gallbladder motility (movement), and perhaps diet.

Cholesterol gallstones develop when bile contains too much cholesterol and not enough bile salts. Besides a high concentration of cholesterol, two other factors seem to be important in causing gallstones. The first is how often and how well the gallbladder contracts; incomplete and infrequent emptying of the gallbladder may cause the bile to become overconcentrated and contribute to gallstone formation. The second factor is the presence of proteins in the liver and bile that either promote or inhibit cholesterol crystallization into gallstones.

Other factors also seem to play a role in causing gallstones but how is not clear. Obesity has been shown to be a major risk factor for gallstones. A large clinical study showed that being even moderately overweight increases one's risk for developing gallstones. This is probably true because obesity tends to cause excess cholesterol in bile, low bile salts, and decreased gallbladder emptying. Very low calorie, rapid weight-loss diets, and prolonged fasting, seem to also cause gallstone formation.

In addition, increased levels of the hormone estrogen as a result of pregnancy, hormone therapy, or the use of birth control pills, may increase cholesterol levels in bile and also decrease gallbladder movement, resulting in gallstone formation.

No clear relationship has been proven between diet and gallstone formation. However, low-fiber, high-cholesterol diets, and diets high in starchy foods have been suggested as contributing to gallstone formation.

Who Is at Risk for Gallstones?

This year, more than 1 million people in the United States will learn they have gallstones. They will join the estimated 20 million Americans—roughly 10 percent of the population—who already have gallstones.

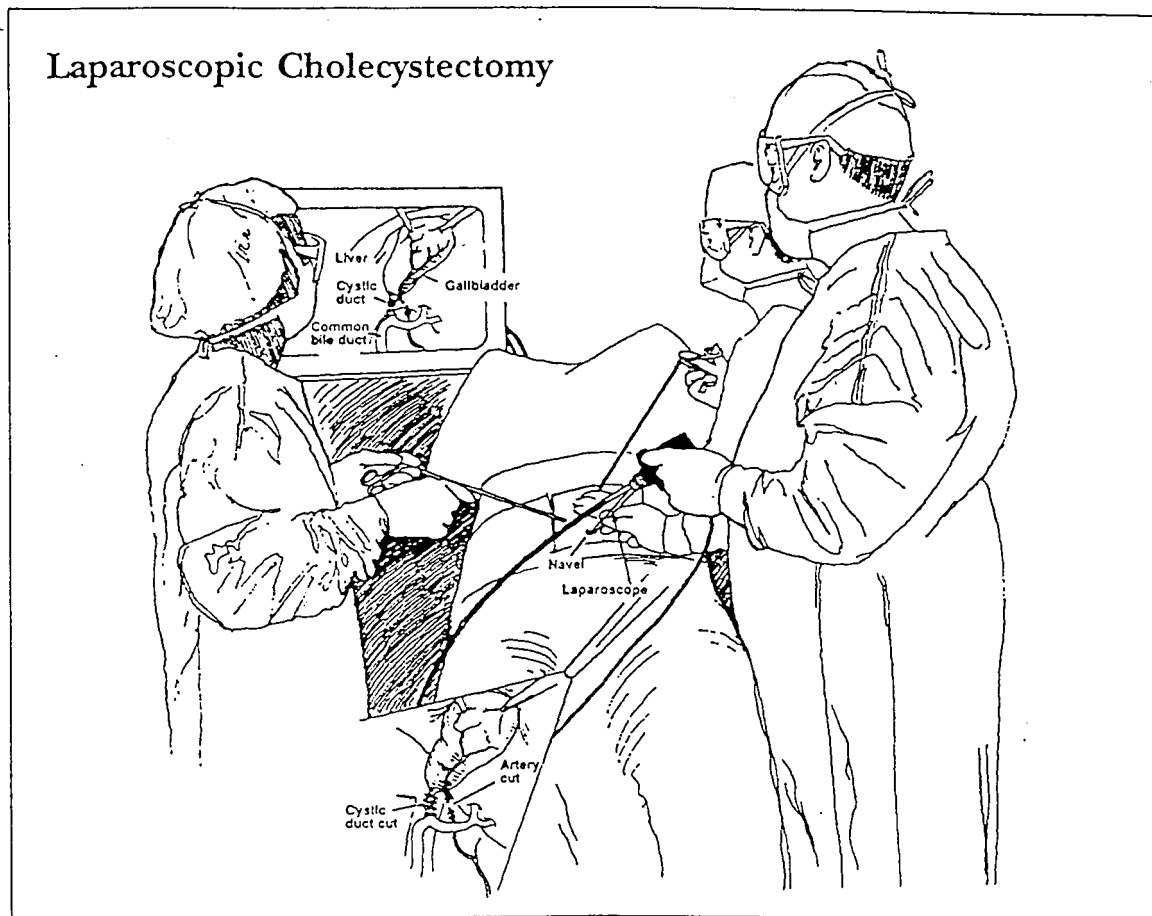
Those who are most likely to develop gallstones are:

- Women between 20 and 60 years of age. They are twice as likely to develop gallstones than men.
- Men and women over age 60.
- Pregnant women or women who have used birth control pills or estrogen replacement therapy.
- Native Americans. They have the highest prevalence of gallstones in the United States. A majority of Native American men have gallstones by age 60. Among the Pima Indians of Arizona, 70 percent of women have gallstones by age 30.
- Mexican-American men and women of all ages.
- Men and women who are overweight.
- People who go on "crash" diets or who lose a lot of weight quickly.

What Are the Symptoms of Gallstones?

Most people with gallstones do not have symptoms. They have what are called silent stones. Studies show that most people with silent stones remain symptom free for years and require no treatment. Silent stones usually are detected during a routine medical checkup or examination for another illness.

Laparoscopic Cholecystectomy



used in individuals who cannot tolerate surgery. Treatment may be required for months to years before gallstones are dissolved.

Mild diarrhea is a side effect of both drugs; chenodiol may also temporarily elevate the liver enzyme transaminase and mildly elevate blood cholesterol levels.

Two therapies, contact dissolution with methyltert butyl ether instillation through a catheter placed into the gallbladder and extracorporeal shock-wave lithotripsy (ESWL), are still experimental.

Each of these alternatives to gallbladder surgery leaves the gallbladder intact; so stone recurrence, which happens in about one-half the cases, is a major drawback.

Additional Readings

Gupta, KL. Cholelithiasis: New options for diagnosis and treatment of its complications. *Senior Patient* 1991; 3(1): 42, 44-46. Article for health professionals explores new options for diagnosis of gallstones and treatment of complications.

Lewis, R. Gallbladder: an organ you can live without. *FDA Consumer* 1991; 25(4): 13-15. Article for a lay audience reviews current information about gallbladder function and disease.

Traverso, LW. Laparoscopic cholecystectomy. *Practical Gastroenterology* 1991; 15(4): 16, 21, 25-27. Article for health professionals discusses surgical technique of laparoscopic cholecystectomy.

Your gallstones: diagnosis and treatment, 1991. Digestive Disease National Coalition, 711 Second Street, NE, Suite 2, Washington, DC 20002; (202) 544-7497. Brochure outlines causes, diagnosis, and treatments of gallstones.

National Digestive Diseases Information Clearinghouse

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