



# GALLSTONES: WHAT TO DO?

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Gallstones are present in 20% of women and 8% of men over the age of 40 in the United States. Most are unaware of their presence, and the consensus is that if they are not causing trouble, they should be left in place. Nevertheless, gallbladder removal (which surgeons awkwardly call *cholecystectomy*) is one of the most common surgical procedures, and most people know someone who has had such an operation. Space does not permit a complete discussion here about the vast gallstone literature. What I shall try to convey are the questions to ask if you are found to have gallstones. The central question will be, "Are the gallstones causing symptoms?"

## What are Gallstones?

The gallbladder is situated below the liver under the right rib cage at the front of the abdomen (Figure 1). It is a reservoir for bile connected by the cystic duct to the common bile duct. The common bile duct flows from the liver into the upper small intestine (duodenum). Bile is a complex liquid produced in the liver, which for the purposes of our discussion contains cholesterol, bile salts, and bile pigments. This dark liquid is stored temporarily in the gallbladder to be discharged after a meal where the bile salts play an important role in the intestinal absorption of fats and fat-soluble vitamins (A, D, E, and K).

In the gallbladder, water-insoluble cholesterol is suspended in solution by bile salts and certain fatty acids. The equilibrium between solution and precipitation of cholesterol is delicate and critical. Many factors may disturb this equilibrium causing precipitation of cholesterol and its formation into gallstones. Eighty percent of gallstones are entirely, or principally cholesterol. In the remainder, the stones result from the precipitation of bile pigments.

## What Factors Favor the Formation of Gallstones?

Obesity is an important cause of gallstones, as is the ingestion of high cholesterol and high fat diets. Paradoxically, rapid weight loss increases biliary cholesterol and can precipitate gallstones. During pregnancy, up to 20% of women have gallstones that fortunately seldom cause trouble. Many of these disappear

after delivery, but successive pregnancies increase the likelihood of lasting stones. This and the added stone-favoring effects of female hormones account for the predominance of gallstones in women. Gallstone prevalence increases with age and in the presence of certain liver diseases such as primary biliary cirrhosis. The cholesterol-lowering drug *clofibrate* (Atromid) may cause stones by increasing cholesterol secretion into bile. Bile salts are normally reabsorbed into the blood by the lower small bowel (ileum) and then into bile. Hence disease or removal of the ileum, as in Crohn's disease, may ultimately cause gallstones.

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Pigment stones are most common in Asia, but are frequently seen with hemolytic anemia where the destroyed blood pigment hemoglobin is transformed to bile pigment in the liver and then secreted in excessive amounts in the bile. Age, alcoholic liver disease, and liver infections also may cause pigment gallstones.

## What is the Prognosis of Gallstones?

The presence of gallstones generates some debate about what to do. However, most gallstones cause no trouble and we know of their prevalence only through routine autopsy studies or mass screening efforts. Stones unassociated with symptoms lead to complications or surgery in about 10% of patients after 5 years, 15% at 10 years, and only 18% after 15 years. Such data prompt the experts to recommend no treatment unless complications occur or "gall bladder attacks" interfere with living.

## How Do Gallstones Cause Symptoms?

Gallstones lying innocently in their gallbladder home are harmless. They only cause trouble when they obstruct the cystic or common bile ducts. (Figure 2.) The cystic duct may be

obstructed when a stone lodges within it, or when a large stone lies in a pouch overlying the duct and compresses it. The distended duct and gallbladder, and their efforts to push the stone away, cause severe pain (biliary colic). If the obstruction is not relieved, the gallbladder becomes inflamed—a complication known as *cholecystitis*.

Biliary colic also occurs when the common bile duct is obstructed by an errant stone. Since the common bile duct drains the liver, its obstruction may block the excretion of bile pigment causing the patient to become yellow (jaundiced), and in some cases causing a serious infection of the bile ducts (*cholangitis*).

### What are the Symptoms of Gallstones?

Biliary colic due to obstructed bile ducts is a severe, steady pain under the right rib cage often felt through or around to the back under the right shoulder blade. It is often accompanied by sweating, nausea, and vomiting. Very often it prompts a doctor to inject a narcotic. If the obstruction persists and gallbladder infection intervenes, the pain becomes more intense, the site becomes extremely tender, and fever, extreme exhaustion, and shaking chills occur. For this, medical attention should be sought urgently.

If the stone is in the common bile duct and fails to pass, the resulting infection may be severe, and over several hours jaundice becomes noticeable in the whites of the eyes. Sometimes the jaundice occurs without pain. In either situation it is important to treat the infection promptly and deal with the stone. Infections are particularly difficult to treat in the presence of diabetes. Since the common bile duct empties into the intestine close to the pancreatic duct, an impacted stone may sometimes cause pancreatitis.

### What are *Not* the Symptoms of Gallstones?

As described in other IFFGD publications, benign abdominal pain, dyspepsia, heartburn, and irritable bowel syndrome (IBS) are very common, occurring cumulatively in over half of adults. Since gallstones and these functional gastrointestinal disorders are each so very common, it is inevitable that they will frequently occur together. Such a relationship is not causal. These functional symptoms should not be attributed to gallstones, thus precipitating an unnecessary operation.

Heartburn is a burning pain usually in the lower chest due to reflux of gastric acid into the esophagus. Characteristically it is worse with reclining or lifting and greatly relieved by antacids and especially proton pump inhibitors. Dyspepsia is characterized as a chronic pain or discomfort in the pit of the stomach. It may be caused by a peptic ulcer and seldom reaches the level of pain seen in biliary colic, which tends to be occasional and unpredictable. Jaundice and infection (often indicated by fever) are not features of dyspepsia. The pain of IBS is infrequently felt in the upper abdomen and is chronic, without fever, and invariably associated with defecation. Sadly, IBS patients have been prone to unnecessary surgery.

### What are the Complications of Gallstones?

The complications of gallstones are alluded to above, and are the comprehensive topics of textbooks. Suffice it to say here that gallstones are serious. They frequently require hospital

admission, and in most cases surgical treatment. Features that mandate immediate medical attention are a sudden, very severe pain in the mid or right upper abdomen, accompanied by any of fever, chills, extreme exhaustion, and jaundice.

### How are Gallstones Diagnosed?

Sometimes gallstones contain calcium and may be seen coincidentally on a plain x-ray of the abdomen done for some

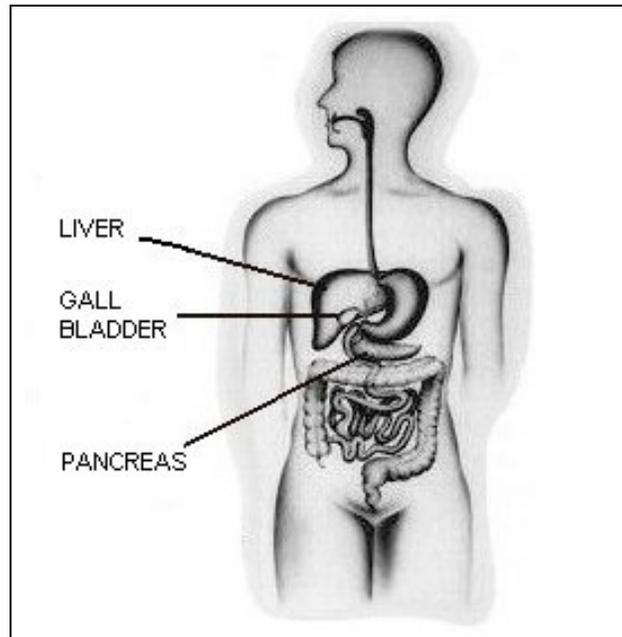


Figure 1

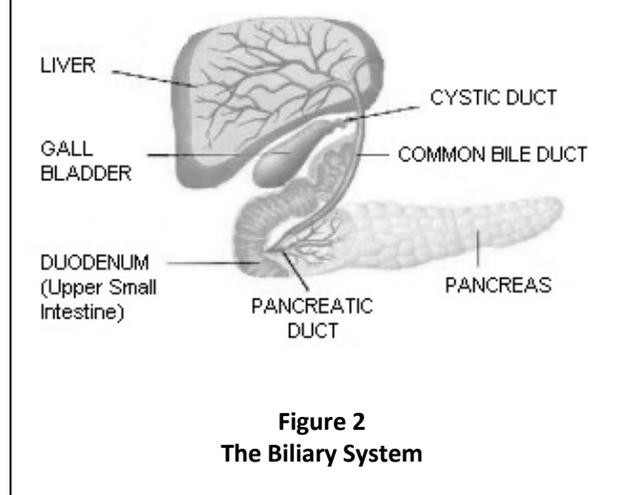


Figure 2  
The Biliary System

other reason. Similarly they may be found on abdominal ultrasound, computerized tomography (CT), or even during abdominal surgery. In the light of the above discussion, treatment should be taken only if symptoms or complications can be attributed to the stones. Occasionally, doctors may advise gallstone surgery if the patient has diabetes, or will be in areas remote from medical care.

If gallstones are suspected because of symptoms, the most reliable and cost-effective test is abdominal ultrasound. This procedure is non-invasive, painless, and employs no harmful radiation. In some circumstances an oral *cholecystogram* may be done. This is a plain x-ray of the gall bladder region after ingestion of a dye that concentrates in the gall bladder. CT scans and certain radioisotope tests are also reserved for special circumstances.

### How are Gallstones Treated?

The treatment of choice for troublesome gallstones is removal of the gallbladder (*cholecystectomy*). Most surgeons now offer a laproscopic cholecystectomy whereby the cystic duct is severed and sealed and the gallbladder is removed via narrow endoscopes inserted through tiny incisions into the abdomen. This permits earlier post-operative recovery and discharge from hospital, less complications (less than 5%) and a mortality of less than 0.1%. In about 5% of cases the operation must be converted to a full abdominal incision for technical reasons.

If a stone is suspected to be in the common bile duct, especially in the presence of jaundice, an endoscopic retrograde cholangiopancreatography (ERCP) may be done before surgery. This procedure involves passage of an endoscope through the mouth and stomach into the duodenum. The bile ducts are explored and any stones are removed through the instrument. [See accompanying article.]

Medical removal of gallstones may be accomplished by the daily ingestion of a bile salt (e.g. ursodeoxycholic acid) over many months until the stones dissolve. This is expensive, only effective with pure cholesterol stones, and stones recur in about 50% of cases. Another treatment is to smash the stones with shock waves (lithotripsy). As with bile salt treatment, recurrences are likely and lifetime bile salt therapy may be required. Such treatments are reserved for those who either refuse, or who are deemed too ill for surgery.

### Conclusion

This brief summary begins to answer some important questions about gallstones. It is no substitute for a thorough discussion of your own case with your family doctor. Remember that most gallstones do not cause symptoms and can be safely left alone. Moreover, gallstones do not cause

most abdominal pains. While relatively safe and very effective when indicated, surgery inevitably causes complications in a few.

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