



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. Many people are unaware of their presence, and healthcare providers typically advise leaving them alone unless they cause problems. Nevertheless, gallbladder removal (which surgeons call *cholecystectomy*) is a common surgical procedure that most people are familiar with. While there is a lot of information available about gallstones, the most important question to ask if you are diagnosed with them is whether they are causing any symptoms.

What are Gallstones?

The gallbladder is situated below the liver under the right rib cage at the front of the abdomen (Figure 1). The gallbladder acts as a reservoir, or storage place, for bile. Bile is a complex liquid produced by the liver that helps the body to break down fats. It contains cholesterol, bile salts and bile pigments. The gallbladder is connected to the common bile duct by the cystic duct, which allows bile to flow into the upper small intestine (duodenum). This dark liquid is released from the gallbladder 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. This balance between solution and precipitation of cholesterol is delicate and critical, with many factors capable of disturbing this equilibrium. For example, if the liver produces more

cholesterol than bile can dissolve, the excess cholesterol may precipitate as crystals. With time, the crystals may grow to form stones and block the ducts. Up to eighty percent of gallstones are entirely, or mainly cholesterol.

What Factors Favor the Formation of Gallstones?

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 also 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. Diseases like Crohn's disease that affect or remove the ileum can ultimately cause gallstones.

Obesity is a major cause of gallstones due to the ingestion of high cholesterol and high fat diets. Interestingly, rapid weight loss also leads to gallstones due to increases of biliary cholesterol. During pregnancy, up to 20% of women develop gallstones, but most of them disappear after delivery. However, repeated pregnancies can increase the risk of lasting gallstones. This and the added stone-favoring effects of female hormones account for the predominance of gallstones in women.

Pigment gallstones are most common in Asia and are often associated with hemolytic anemia. This occurs when the hemoglobin, a blood pigment, is broken down in the liver and transferred into the bile pigment which gets secreted in large amounts in the bile. Other factors that may contribute to pigment gallstones include age, alcoholic liver disease, and liver infections.

What is the Prognosis of Gallstones?

There is some debate on how to handle the presence of gallstones. However, most gallstones do not cause any issues and are typically only discovered through routine autopsy studies or mass screening efforts. Stones not associated 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. Based on this data, experts recommend no treatment unless complications occur or "gall bladder attacks" interfere with living.

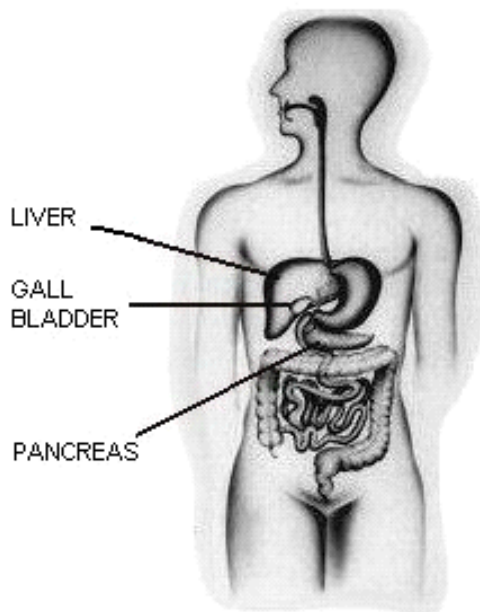
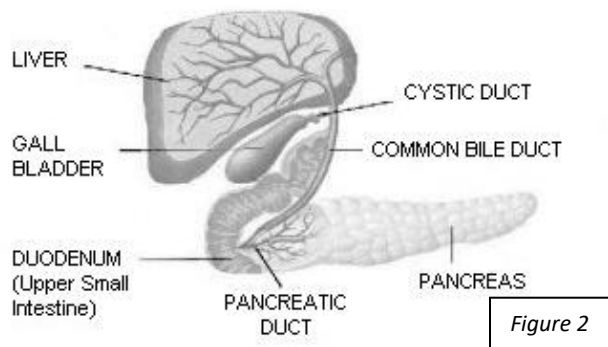


Figure 1

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 a 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 healthcare provider to inject a narcotic. If the obstruction persists and a gallbladder infection occurs, the pain becomes more intense, the site becomes extremely tender, and fever, extreme exhaustion, and shaking chills occur. If this occurs, medical attention should be sought immediately.

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. Since the common bile duct empties into the intestine close to the pancreatic duct, an impacted stone may sometimes cause inflammation of the pancreas known as pancreatitis.

What are Not the Symptoms of Gallstones?

Many gastrointestinal symptoms such as abdominal pain, dyspepsia, and heartburn, as well as disorders like irritable

bowel syndrome (IBS) are very common, occurring cumulatively in over half of adults. Since gallstones and these functional gastrointestinal disorders are so common, it is inevitable that they will occur together.

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 may be relieved by antacids and/or proton pump inhibitors (PPIs).

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.

Irritable bowel syndrome (IBS) is a disorder characterized by two key elements:

- 1) an abdominal component generally described as pain and/or discomfort and
- 2) a change in bowel habits which could include changes in stool texture (how the BM looks) and/or frequency (how often you have BM).

Changes in stool texture includes experiencing constipation, diarrhea, or both. Constipation is commonly defined as having three (3) or fewer bowel movements (BMs) a week, and/or difficulty passing BMs. Diarrhea is defined as loose, watery, or frequent BMs.

IBS and other common gastrointestinal symptoms should not be attributed to gallstones without proper diagnosis. This will prevent unnecessary operations.

What are the Complications of Gallstones?

Serious complications, like the ones mentioned above, typically require hospitalizations or surgical treatment. If you experience a sudden, intense pain in the mid or right upper abdomen along with symptoms of fever, chills, extreme exhaustion or jaundice, seek immediate medical attention.

How are Gallstones Diagnosed?

Sometimes gallstones contain calcium and may be seen on a plain x-ray of the abdomen done for other reason. Similarly, they may be found on abdominal ultrasound, computerized tomography (CT), or even during abdominal surgery.

An abdominal ultrasound is a noninvasive imaging test that uses sound waves to see inside the belly (abdomen) area. Computed tomography (CT) scan is a test that uses a series of X-rays and a computer to produce a 3D image of the inside of your body.

Treatment should be taken only if symptoms or complications can be attributed to the stones. Occasionally, healthcare providers 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 an 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 laparoscopic 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 the 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 the 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.

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.

What are Some Possible Complications after Gallbladder Surgery?

Gallbladder removal is generally a safe procedure, but like all surgeries, it can have both short-term and long-term complications. Some people experience changes in bowel habits or other digestive symptoms, and in rare cases, chronic abdominal pain.

Long-term issues following gallbladder removal include:

- **Bile Acid Diarrhea:** The gallbladder's role is to store bile produced by the liver, which aids in fat digestion. Following removal, bile flows directly into the small intestine, which can cause an increased frequency of bowel movements or diarrhea, especially after meals.
- **Sphincter of Oddi Dysfunction:** In some cases, dysfunction of the Sphincter of Oddi can lead to recurrent pain in the right upper quadrant or the upper middle part of the abdomen, and this can continue to occur after gallbladder surgery.
- **Post-cholecystectomy Syndrome (PCS):** Some people continue to experience abdominal pain, bloating, nausea, or diarrhea after gallbladder removal. This is known as Postcholecystectomy Syndrome. The causes can vary, and it may be due to residual gallstones, sphincter of Oddi dysfunction, or changes in bile flow.
- **Biliary Injury:** Although rare, injury to the bile ducts can occur during surgery, which can lead to bile leakage into the abdomen and cause pain or infection.
- **Dietary Intolerance:** Some people might experience intolerance to certain types of foods, particularly fatty or greasy foods, after gallbladder removal.

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 healthcare provider. Remember that most gallstones do not cause symptoms and can be safely left alone. Moreover, gallstones do not cause most types of abdominal pains. While relatively safe and very effective when indicated, surgery inevitably causes complications in a few.

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