

## Gallstones

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Gallstones are relatively common - about 10-15% of people in the European population have them. The relative risk of gallstones is different in some ethnic groups: Native Americans on average tend to have the highest rates, while gallstones are much less common in African populations.

Many factors influence the likelihood of developing gallstones. They become more likely as we get older. Women are four times more likely to have gallstones than are men, which is mainly due to the higher level of oestrogen that women normally have. This is also why gallstones can form during pregnancy.

Other factors can increase the risk, such as low alcohol consumption or a high intake of caffeine in men, or a lack of physical exercise in women. There is some evidence that there is a genetic link to gallstone-related disease.

Despite being so common, four out of five people who have gallstones never experience any problems - their gallstones are said to be asymptomatic. Only about one in a hundred people who have asymptomatic gallstones later go on to have problems with them.

### **How are gallstones formed?**

Gallstones are formed from the components that make up bile, which is manufactured in the liver and stored in the gallbladder. Bile is a mixture of cholesterol, bile salts, fats and natural products of the breakdown of blood.

The precise mechanism by which gallstones are formed is still not entirely understood. However, there are three main mechanisms by which normal bile can begin to form into stones.

The first is an increase in the proportion of cholesterol within the bile, which makes it more likely that tiny cholesterol stones will form, after which they can increase in size and number.

The second major cause of stones to form is an abnormality in the breakdown of blood products, to form what are known as pigment stones.

Finally, if the gallbladder itself does not empty itself fully, or in an abnormal manner, the bile that is left behind is much more likely to have stones form within it.

## Signs and symptoms

Gallstones typically present with pain that is felt in the upper half of the abdomen, usually in the middle or on the right side, just below the ribcage.

The pain is described as like a cramping, spasm-type pain (known as colicky pain), that can often also be felt going through to the back or to the right shoulder, a process known as radiation.

These episodes of pain tend to last around thirty minutes and may come and go over many hours. Food, especially very fatty meals, can cause the attacks.

The painful episodes can be accompanied by bouts of nausea, vomiting and feeling hot and sweaty.

Rarely patients might notice a yellow colouration in the whites of their eyes or, in more severe cases, of the skin itself, a symptom known as jaundice. The urine may go very dark and the stool can become a pale clay colour. These symptoms can suggest that the gallstones are causing complications by obstructing the free passage of bile from the liver and into the bowel.

## Diagnosing gallstone disease

The classic presentation of symptoms described above can suggest gallstone disease. Mr Giles Bond-Smith will need to take a thorough history of your symptoms and examine you.

Blood tests may then be arranged to look for signs of infection, blockage of the drainage system of the liver or other pathology associated with the liver, gallbladder or pancreas.

For simple gallstones, an ultrasound scan is considered to be the 'gold standard' test. Ultrasound scans are very good at identifying gallstones within the gallbladder, assessing the gallbladder itself and also assessing the biliary tree.

If there are concerns that the gallstones may be causing problems other than pain—known as complex gallstone disease - then further imaging may be required.

This normally takes the form of a special MRI scan called an MRCP. This type of scan has no radiation and does not use any contrast so is okay to be used in pregnant patients and also those patients with poor renal function.

If a gallstone has passed from the gallbladder and become lodged in the biliary tree then it is normal to remove the gallstone from the biliary tree prior to undergoing an operation to remove the gallbladder, to stop any further problems arising relating to gallstones or the gallbladder.

The process of removing a gallstone from the biliary tree requires a specialised endoscopic procedure to be carried out. This procedure is known as an Endoscopic Retrograde CholangioPancreatography, or ERCP for short.

This involves passing a thin fibre-optic camera down the mouth and into the gut, from which it looks back up towards the opening of the biliary tree. Through this camera, the surgeon can then see precisely what is going on.

The ERCP allows interventions to be carried out that can include removing lodged or obstructing gallstones, placing stents (small plastic/metal tubes) to allow drainage of the biliary tree and in some cases allow brushing or biopsies to be taken.

## **Treatment**

Treatment falls into two categories Non-Operative and Operative.

### **Non- Operative treatments:**

For those people who are not fit enough to undergo an operation, there are oral dissolution medications available such as Ursodeoxycholic Acid which work to dissolve the gallstones. It only works on cholesterol stones and can take many months to act. This may be effective in 10-15% of patients.

Changing the diet to a "low to no fat" diet or avoiding large or heavy meals may help reduce the symptoms the patient is experiencing. The change in diet will not get rid of the gallstones.

### **Operative treatments:**

The 'gold standard' treatment for gallstone disease is a surgical procedure known as a laparoscopic cholecystectomy, often called a 'lap chole' for short. This is a 'keyhole' procedure that is performed under a general anaesthetic, usually as a day-case operation.

A keyhole procedure allows the surgeon to make a cut, 2-3cm long, often just below the umbilicus in order to place a small camera to inspect the inside of the abdomen without having to make a large cut.

The operation involves making a total of 4 small incisions in the abdomen, one just below the umbilicus (2-3cm long), one in the upper abdomen below the breastbone (2-3cm long) and two beneath the right ribcage (1-2cm long). Through these incisions a number of fine, laparoscopic instruments are passed, including a camera through which the surgeon can visualise the inside of the abdomen. The gallbladder is identified, removed from the liver, under which it sits, and the cystic duct that connects the gallbladder to the biliary tree is clipped and cut. The gallbladder is then removed via the incision just below the umbilicus. All of the incisions are then closed using dissolvable stitches.

The operation normally takes 30-90 minutes, depending on the size of the gallbladder, how inflamed the gallbladder is and the technical difficulty of the operation.

2-5% of laparoscopic cholecystectomies cannot be carried out using the keyhole method and need to be converted to a traditional open operation. This means that a cut 10-30cm long needs to be made below the right ribcage.

The reasons that a laparoscopic cholecystectomy may need to be converted to an open operation include extensive inflammation or scarring of the gallbladder, an inability to visualise important anatomical structures, excessive bleeding or gallstones identified in the common bile duct

### **Complications of Gallstones**

Gallstone disease can become complicated and cause problems for the patient.

Gallstones can slip or move out of the gallbladder and become stuck in the biliary tree. A gallstone becoming lodged in the biliary tree, or passing down

the biliary tree, can cause obstructive jaundice and biliary colic (pain), as described above.

The gallbladder can become infected, a condition known as cholecystitis. The infection can sometimes become severe and fill the gallbladder with pus. This is known as a gallbladder empyema.

If the infection spreads into the biliary tree, it is known as ascending cholangitis.

Gallstones can erode their way out of the gallbladder into the biliary tree itself or into the bowel, causing further associated problems.

The passage of gallstones from the gallbladder into the biliary tree and down out into the bowel can cause the pancreas to become inflamed resulting in a condition known as pancreatitis.

All of these risks must be weighed up when embarking on a decision to adopt a non-operative versus operative approach to managing gallstone disease.