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Understanding **Gallstones**



Introduction

Gallstones are hardened collections of bile materials that develop in your gallbladder. They can be as small as a grain of sand or as big as a ping pong ball. The condition of having gallstones is called cholelithiasis.

What are Gallstones?

Gallstones form in your gallbladder, the small, pear-shaped organ where your body stores bile. They are pebble-like pieces of concentrated bile materials. Bile fluid contains cholesterol, bilirubin, bile salt and lecithin. Gallstones are usually made up of cholesterol or bilirubin that collect at the bottom of your gallbladder until they harden into "stones."

They grow gradually, as bile continues to wash over them and they collect extra materials. Actually, it's the smaller stones that are more likely to cause trouble. That's because smaller stones can travel, while bigger ones tend to stay put. Gallstones that travel may get stuck somewhere and create a blockage, larger stones can cause compressive symptoms.

What are Cholelithiasis?

Cholelithiasis or gallstones are hardened deposits of digestive fluid that can form in your gallbladder. Many people have cholelithiasis and are unaware. But gallstones can sometimes cause problems by creating a blockage. This will cause pain and inflammation in your organs. If it goes untreated, it can cause serious complications.



How does having gallstones (cholelithiasis) affect me?

Your gallbladder is part of your biliary system. It belongs to a network of organs that pass bile between each other. These organs are connected by a series of pipelines called bile ducts. Bile travels through the bile ducts from your liver to your gallbladder, and from your gallbladder to your small intestine. Your pancreas also uses the bile ducts to deliver its own digestive juices.

A gallstone that travels to the mouth of your gallbladder can obstruct the flow of bile in or out. A gallstone that makes its way out of your gallbladder and into the bile ducts could block the flow of bile through the ducts. This will cause bile to back up into the nearby organs. When bile backs up, it builds pressure and pain in your organs and bile ducts leading to inflammation.

This can also lead to a variety of complications, including:

- o **Gallbladder disease:** Gallstones are the most common cause of gallbladder diseases. When they get stuck, they cause bile to back up into your gallbladder, causing inflammation. This can do long-term damage to your gallbladder over time, scarring the tissues and stopping it from functioning. The stalled flow of bile also causes infection in your gallbladder



- **Liver disease:** A blockage anywhere in the biliary system can cause bile to back up into your liver. This will cause inflammation in your liver, leading to an increased risk of infection and long-term scarring over time (cirrhosis). If your liver stops functioning well, your whole biliary system breaks down
- **Gallstone pancreatitis:** A gallstone that blocks the pancreatic duct will cause inflammation in your pancreas. As with your other organs, temporary inflammation causes pain, and chronic inflammation causes long-term damage that can stop your organ from functioning
- **Cholangitis:** Inflammation in your bile ducts can lead to infections in the short term and scarring in the long term. Scarring in your bile ducts causes them to narrow, which restricts the flow of bile. This can cause long-term bile-flow problems even after the blockage has been removed
- **Jaundice:** Backed-up bile will leak into your bloodstream, making you sick. Bile carries toxins that your liver has filtered from your body. The bilirubin content has a yellow colour, which will be visible in the whites of your eyes
- **Malabsorption:** If bile can't travel to your small intestine as intended, you might have difficulty breaking down and absorbing nutrients from your food. Bile is particularly important for breaking down fats and for absorbing fat-soluble vitamins in your small intestine



What is the main cause of gallstones?

As much as 75% of gallstones are made up of excess cholesterol. So, we could say that having excess cholesterol in your blood is the leading cause of gallstones. You might have extra cholesterol for various reasons. Some of the most common reasons include, metabolic disorders, such as obesity and diabetes.

High blood cholesterol leads to higher cholesterol content in your bile. Your liver filters cholesterol from your blood and deposits it in bile as a waste product before sending the bile to your gallbladder. Chemicals in bile (lecithin and bile salts) are supposed to dissolve cholesterol. But if there's too much of it, these chemicals might not be up to the task.

What else causes cholelithiasis?

Other factors that contribute to gallstones include:

- **Excess bilirubin:** About 25% of gallstones are made up of excess bilirubin instead of cholesterol. Bilirubin is a byproduct that's produced when your liver breaks down red blood cells. Certain medical disorders can cause your liver to produce extra bilirubin while doing its job. Some of these include infections, blood disorders and liver disease
- **Gallbladder stasis:** Your small intestine signals to your gallbladder to send bile when it has fats to digest. When your gallbladder is healthy, it contracts to efficiently move bile out when necessary. But if your gallbladder doesn't contract well enough, some bile may be left behind. This bile gradually concentrates into a kind of sludge at the bottom of your gallbladder, which then crystallizes



Who is most at risk for gallstones?

Anyone can develop gallstones, including children, but they are more common after the age of 40. That's because gallstones grow very gradually. It may take 10 to 20 years for gallstones to grow large enough to cause symptoms. They are also more common in people assigned female at birth than in those assigned male at birth, by a ratio of 3:1. This is due to the effects of female hormones.

Other common risk factors include:

Metabolic syndrome: A constellation of metabolic risk factors, including obesity, high blood triglycerides and insulin resistance, contribute to the risk of cholesterol gallstones.

What are the first signs of having gallstones?

The most typical symptom is a type of abdominal pain, in the right upper quadrant of your abdomen, called biliary colic. It occurs in episodes that last for one to several hours, usually after a large or rich meal. That's when your gallbladder contracts to send bile to your small intestine for digestion. The pain may be referred to the region between the shoulder blades.



Do gallstones cause other symptoms?

When gallstone causes a persistent blockage or an infection, you will have symptoms of acute inflammation. This may include:

- Constant pain
- Fever and chills
- Heart rate accelerations

You may also begin to show symptoms of bile accumulating in your bloodstream, which may include:

- Jaundice
- Sunken eyes
- Dark-coloured pee

How are gallstones diagnosed?

If you're experiencing symptoms of biliary colic, your healthcare provider will investigate with blood and imaging tests. Blood tests can detect inflammation, infection or jaundice. They can also give your healthcare provider clues about which organs are being affected. Imaging tests will help locate the source of the blockage. They will usually start with an ultrasound.



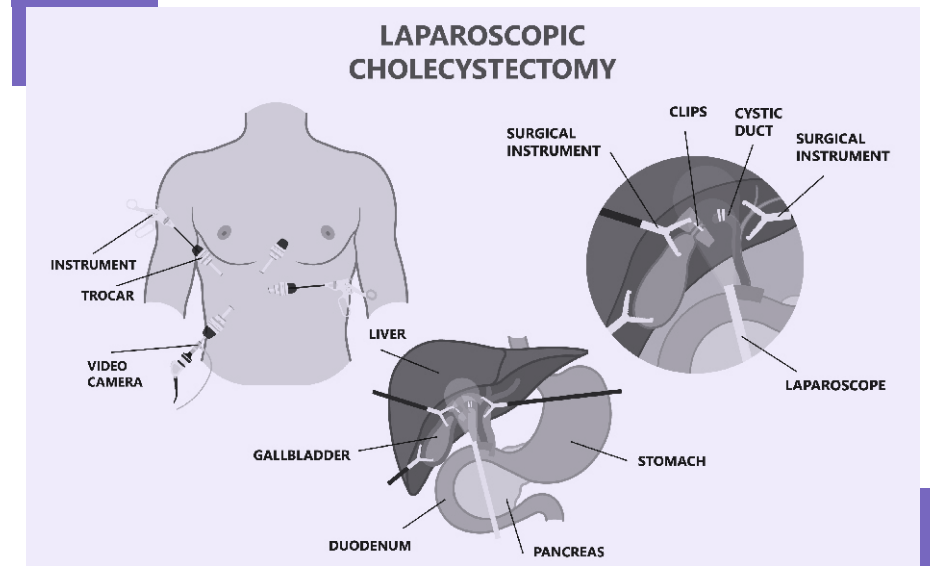
What tests are used to diagnose cholelithiasis?

Ultrasound: An abdominal ultrasound is a simple and non-invasive test that requires no preparation or medication. It's usually all that's needed to locate gallstones. However, it doesn't visualize the common bile duct very well. If your healthcare provider suspects there's a gallstone hidden in there, they might need to use another type of imaging test to locate it.

MRCP: Magnetic Resonance Cholangiopancreatography (MRCP) is a type of MRI that specifically visualizes the bile ducts. It's non-invasive and creates very clear images of your biliary system, including the common bile duct. Your healthcare provider might use this test first to find a suspected gallstone there. But if they're already sure it's there, they might skip it and go straight to an ERCP.

ERCP: ERCP stands for Endoscopic Retrograde Cholangiopancreatography. This test is a little more invasive, but it's a useful one for finding gallstones which has slipped into bile duct. It can also be used to remove them from the ducts if they are stuck there. It uses a combination of X-rays and endoscopy, which means passing a tiny camera on the end of a long tube down your throat and into your upper GI tract. (You'll have medication to make this easier.)

When the camera (endoscope) reaches the top of your small intestine, your healthcare provider will slide another, smaller tube into the first one to reach farther down into your bile ducts. They will inject a special dye through the tube and then take video X-rays (fluoroscopy) as the dye travels through the ducts. They can insert tools through the tube to remove the stones they find.



Treatment of Gallstone Disease

Laparoscopy: A laparoscopic cholecystectomy uses small, "keyhole incisions" in your abdomen to operate with the aid of a small camera called a laparoscope. Your surgeon inserts the laparoscope through one keyhole and removes your gallbladder through another. Smaller incisions make for less post-operative pain and a faster recovery time.

Open surgery: Some people may have more complicated conditions that require open surgery to manage. If you have open surgery, you will have a longer hospital stay afterwards and a longer recovery at home for your larger incision. Some laparoscopic cholecystectomies may need to convert to open surgery in complicated cases.

Endoscopy: Gallstones in your bile ducts (choledocholithiasis) are removed by endoscopy (ERCP). This doesn't require any incisions. The bile duct stones come out through the long tube that's been passed down your throat. Gallstones in your gallbladder are removed later by removing the gallbladder (cholecystectomy). This can usually be done by laparoscopy, a minimally-invasive surgery technique.



What happens when you don't have a gallbladder anymore? ▬

Your digestive system can still function without a gallbladder. Your gallbladder is mostly a holding place for the bile your liver makes. It delivers bile to your small intestine to help with digestion. When your surgeon removes your gallbladder, bile can flow directly from your liver to your small intestine through the bile ducts.

Will I need to change my diet after gallstone surgery? ▬

Some people may experience temporary indigestion or diarrhoea during the transition period. Your healthcare provider will advise you not to eat anything too rich or fatty while you recover. Most people can return to a normal (but reasonably healthy) diet within a couple of weeks.

Can diet help to prevent gallstones? ▬

You can reduce your risk of cholesterol gallstones, which are the most common type, by reducing cholesterol in your diet. Here are some quick tips:

- **Limit fried and fast foods:** These foods are usually fried in saturated fats, which promote LDL cholesterol (the “bad” type). If you cook with oil, choose plant oils instead of animal fats.

- **Replace red meat with fish:** Red meat is high in saturated fats, while fish is high in omega-3 fatty acids, which promote HDL cholesterol (the “good” type). The good type helps balance the bad type.
- **Eat more plants:** High-fiber fruits, vegetables and whole grains help to clear out excess cholesterol from your body. Eating more plants can also help you keep your overall weight down.
- **Lose weight gradually:** Dieting to lose weight can help reduce the cholesterol content in your blood. But it's better to lose weight at a slow, steady pace of one to two pounds a week. Rapid weight loss can encourage gallstones. Some medication may prevent gallstone formation during rapid weight loss period after bariatric surgery

When should I seek care for gallstones? ▬

If you experience anything like biliary colic, seek immediate attention. Biliary pain is dull and persistent, growing for about 20 minutes and lasting for one to several hours. It's usually in the upper right quadrant of your abdomen, but sometimes it's referred to the back or the shoulder region. It's often accompanied by nausea and vomiting, but vomiting may not relieve it. Ultrasound picks up most gall bladder stones easily and one should see a surgeon early for prompt treatment if above symptoms are present.