

Post-Cholecystectomy Syndrome:

<http://www.medfriendly.com/postcholecystectomysyndrome.html>

Post-cholecystectomy syndrome (abbreviated as PCS) is a group of [signs](#) and [symptoms](#) that occur after a cholecystectomy (removal of the gallbladder). A cholecystectomy is most often performed to treat the formation of stones in the gallbladder. These stones are referred to as gallstones.

The gallbladder is a small, pear shaped sac, located under the liver, which helps store and transport bile to the first part of the small [intestine](#) (known as the duodenum). Bile is a bitter, yellow-green substance released from the liver that carries away waste products.

The liver is the largest organ in the body and is responsible for filtering (removing) harmful chemical substances, producing important chemicals for the body, and other important functions. The small intestine is a part of the intestine that takes in all of the nutrients (healthy substances) that the body needs. The intestine is a tube shaped structure that is part of the digestive tract. The signs and symptoms of PCS are described below.

WHAT ARE THE SIGNS AND SYMPTOMS OF PCS?

The signs and symptoms of PCS may be a continuation of the signs and symptoms that led to the gallbladder removal. However, the signs and symptoms of PCS can also be new ones. One of the most common symptoms of PCS is pain, such as sharp pain in the lower belly or a dull pain. It has been estimated that about 70% of patients with PCS experience pain. Inflammation of the stomach lining can also occur. Possible signs of PCS include fever, nausea, gas, bloating, and diarrhea.

Another sign of PCS is jaundice. Jaundice is a yellowish discoloration of the skin, whites of eyes, and mucous membranes, that is caused by a buildup of bilirubin (a yellow-orange substance found in bile). A mucous membrane is one of four major types of thin sheets of tissue that line or cover various parts of the body, such as the mouth and passages for breathing.

Another possible sign of PCS is an increased amount of bile that flows up to the upper parts of the digestive tract, such as the stomach and the esophagus. The esophagus is a tube-shaped structure that takes food down into the stomach after it is swallowed.

DOES EVERYONE WITH PCS DEVELOP SYMPTOMS?

No. One study founds that 65% of people with PCS do not develop symptoms. This is because an abnormal flow of bile does not always cause symptoms. About 28% of people with PCS have been found to have mild symptoms, 5% with moderate symptoms, and 2% with severe symptoms.

WHAT CAUSES PCS?

The gallbladder normally helps store bile and transport it to the first part of the small intestine (see [above](#) for a description). Without the gallbladder present, the

bile can no longer be stored like it used to be. This changes the way in which bile flows and the way it circulates in the liver. Abnormalities in the flow and circulation of bile are a common cause of PCS. An example of such an abnormality would be a bile leak. The way in which these abnormalities lead to the specific signs and symptoms in PCS is poorly understood. Overall, about 50% of PCS cases are caused by a disease involving the biliary system.

Other causes of PCS include wound pain, disorders of the digestive system, fluid buildup underneath the liver, the formation of stones, and a bulging through of an organ (or part of an organ) through a surgical scar. In about 5% of the cases, the cause of PCS is unknown.

HOW MANY PEOPLE WHO HAVE THEIR GALLBLADDER REMOVED DEVELOP PCS?

About 10 to 15% of people who have their gallbladder removed develop PCS. This comes to about 50,000 new cases of PCS a year.

WHEN DOES PCS BEGIN?

PCS can begin immediately after the surgery to remove the gallbladder or decades later.

HOW IS PCS DIAGNOSED?

It is sometimes difficult to diagnose PCS because the signs and symptoms can be subtle. This is why it is very important for there to be open communication between the doctor and the patient regarding the signs and symptoms that are experienced after a gallbladder removal. PCS is usually a temporary diagnosis until a more specific diagnosis can be made that explains the problems. That is, PCS is just a general diagnosis that is given before a more specific one can be made.

HOW IS PCS TREATED?

The main way to treat PCS is to determine what is causing it so that a more specific diagnosis can be made. The doctor will typically do an extensive physical examination, obtain a thorough history of the patient's problems, and send the patient for tests (see next section) to determine the cause of PCS. The doctor will usually pay particular attention to the diagnosis made prior to the gallbladder removal, the findings from the surgery, and the results of any studies done to examine abnormalities of tissue samples taken during the surgery.

Based on the doctor's findings, he/she will determine which additional tests need to be performed. Only as a last resort will the doctor perform another surgery to identify the cause of PCS. When the cause of PCS is determined, treatment typically proceeds as it normally would according to the diagnosis. Depending on the cause, surgery may be required for treatment. Whether or not surgery is used will depend on if the particular cause is known to respond to surgery.

In patients in which no cause of PCS has been found, some have responded to a technique called sphincteroplasty, which is a surgery that involves the removal of one or more [sphincters](#). A sphincter is a muscle that forms a circle around a tube or natural opening in the body. The sphincter forms a circle around the above-

mentioned structures in such a way that when the muscle tightens and becomes narrower, the opening or space inside of the tubes becomes narrower as well, which can eventually cause them to close.

The sphincters removed in this type of surgery for PCS patients are around the bile ducts and pancreatic ducts. A duct is a tube that allows fluids and/or substances to pass through it, especially those produced by organs in the body known as glands. A gland is an organ in the body made of special cells that form and release materials such as fluid.

If patient continue to have PCS symptoms after all the scans (see sections below) have been done and after a sphincterectomy was performed, the treatment option at that point is to do surgery to explore the area in which the symptoms are occurring. If that does not help find a cause, then a transduodenal sphincteroplasty is usually performed. A transduodenal sphincteroplasty is a surgery that opens up the opening of the bile duct into the first part of the small intestine (known as the duodenum), allowing better drainage of the bile. The small intestine is a part of the intestine that takes in all of the nutrients that the body needs.

It is very important to have an experienced surgeon do this procedure, who is assisted by a well trained team. The patient should be the first and only patient getting this type of surgery in the morning, since it has potential to be a long and complicated procedure.

Some patients with PCS have [irritable bowel syndrome](#) (IBS). IBS is a type of intestinal disorder characterized by large amounts of mucus (a thick slippery fluid) released from the intestine and passed through into the [feces](#) (poop). People with PCS that have IBS are sometimes helped by taking substances (such as [dietary fiber](#)) that add bulk (mass) to the diet. When more mass is added to the diet, the poop becomes larger and moves along the intestine mores easily.

People with PCS that have IBS are sometimes given sedatives (calming drugs) and/or drugs that decrease spasms (sudden, involuntary muscle movements). Patients with diarrhea sometimes respond to cholestyramine, a drug that helps remove acids of bile from the body. Removal of these acids helps control diarrhea.

Patients with PCS in addition to GERD (gastroesophageal reflux disease) or stomach symptoms have been helped by taking medications (known as antacids) that decrease the level of acid in the digestive system. Remember that GERD is a condition in which contents from the stomach flow back up to the esophagus.

Other medications known to help patients with PCS who also have GERD or stomach symptoms include histamine blockers and proton pump inhibitors. Histamine is a natural substance in the body that is released during allergic reactions and leads to many allergic symptoms. In the case of GERD, drugs that block the histamine 2 receptor will decrease the release of acid in the digestive system. Proton pump inhibitors work to decrease the level of stomach acid by shutting down a system in the stomach known as the proton pump. Over 67% of patients with PCS and GERD or stomach symptoms have received some benefit from the drug lovastatin, which helps lower the level of fats and cholesterol in the body. Cholesterol is a waxy, fatty substance found only in animal tissues.

WHAT TYPE OF BLOOD TESTS MAY PCS PATIENTS NEED TO GET?

As was discussed in the previous section, the doctor may send the patient for various tests to try to determine the cause of PCS. This section focuses on blood tests. The most common such test is called a CBC (complete blood count). This test shows the number of various types of red and white blood [cells](#). Red blood cells help carry oxygen in the blood. White blood cells help the body fight against infections. The CBC test is performed to see if an infection is present. If an infection is present, certain types of white blood cells will be abnormally increased in number.

A group of tests that PCS patients often need to get are known as the BMP (basic metabolic panel). The BMP is a group of 8 tests that help determine kidney function, electrolyte levels, and the levels of glucose (a type of blood sugar) and calcium (a natural element that is very important in [bone](#) formation). The kidneys are two organs located on each side of the spine, behind the stomach. The kidneys filter (remove) wastes from the blood. Electrolytes are chemical substances that are able to conduct electricity after they are melted or dissolved in water.

Another test a PCS patient may get is called the amylase test, which helps determine the functioning of the intestines and pancreas (a long organ in the back of the belly). The doctor will perform this test in a PCS patient to determine if there is any disease of the pancreas. The amylase test can be done with a blood or urine (pee) sample.

Another type of blood test called the HFP (hepatic function panel) test is often given to PCS patients. The HFP test helps to determine the function of the liver and the tracts that carry the bile. A PT test (prothrombin time) is another test that may be given to PCS patients for the same reason. The PT test works by taking a blood sample and determining how quickly it clots (when the blood comes together as a solid).

If the patient with PCS becomes suddenly ill, a test known as a blood gas may be performed. A blood gas is a test that helps determine how acidic the blood is by measuring the amount of oxygen, carbon dioxide, and bicarbonate in the blood. Bicarbonate is a substance in the blood that prevents it from becoming too acidic or too alkaline (non-acidic). Carbon dioxide is a colorless and odorless gas that is present in small amounts in the air and is produced as a result of metabolism in the body. Metabolism is the chemical actions in cells that release energy from nutrients or use energy to create other substances.

A blood test may be done to look for hepatitis. Hepatitis is an infection of the liver that causes liver inflammation. A cardiac enzyme test may be performed, which helps determine the functioning of the heart. This is done by determining the levels of various enzymes that are associated with heart functioning. An enzyme is a type of protein that helps produce chemical reactions in the body.

A blood test to determine the functioning of the thyroid gland may be performed. The thyroid gland is a butterfly-shaped organ located in the front of the neck that plays an important role in metabolism. A lipase test may be performed for PCS patients. Lipase is any one of a number of enzymes (see last paragraph) that helps break down fats in the body, known as lipids. A lipase test measures the amount of

lipase, which helps determine the functioning of the pancreas, kidneys, and intestines.

Another test that PCS patients are often asked to get is a gamma-glutamyl transpeptidase (GGTP) test. GGTP is a type of enzyme that plays a role in metabolism. The level of GGTP is abnormally increased in the blood of patients with several types of gallbladder or liver disorders

WHAT TYPE OF SCANS MAY PCS PATIENTS NEED TO GET?

Scans are another type of test that PCS patients will likely be asked to get. There are many different types of scans. A scan that many people with PCS are asked to get is an X-ray of the chest and belly. The x-ray will produce pictures that the doctor will use to determine if there is any disease in the lower lung, chest, or diaphragm. The diaphragm is a muscular-fibrous area that separates the chest and abdomen (belly). Patients with a history of back pain or arthritis will usually be asked to get X-rays of their lower back. Arthritis is an inflammatory condition of the joints, which is a place where two bones contact one another.

Patients with pain in the upper right section of the belly may be asked to get a barium swallow to assess the upper part of the digestive tract (esophagus, stomach, first part of the small intestine). When doctors use this technique, they usually call it an upper GI (abbreviation for gastrointestinal) or an upper GI series (since a series of pictures are taken).

A barium swallow study is a technique in which a patient swallows a substance containing the metallic chemical, barium sulfate. After the patient swallows the substance containing barium sulfate, a series of x-rays are taken. The barium sulfate assists doctors in visualizing the resulting picture from the X-ray better. The small intestine can be examined in more detail with a small bowel follow-through (SBF) test. This test uses x-rays of the small intestine after a contrast substance has been sent through the small intestine. Contrast is a liquid substance (such as barium sulfate) that helps form an artificial distinction between organs in the body so that the doctor can tell them apart on a visual image (such as an X-ray).

Some of the things that doctors are looking for with the barium swallow scans include inflammation of the esophagus, GERD (gastroesophageal reflux disease), and PUD (peptic ulcer disease). GERD is a condition in which contents from the stomach flow back up to the esophagus.

Peptic ulcer disease is an ulcer that forms in any part of the digestive system (such as the stomach) that is exposed to stomach juices and pepsin (an enzyme that helps break down proteins). An ulcer is an open sore on the skin or on a mucous membrane. A mucous membrane is one of four major types of thin sheets of tissue that line or cover various parts of the body, such as the mouth and passages for breathing.

Sometimes, barium swallow studies are not performed because an esophagogastroduodenoscopy (EGD) is done instead. EGD involves placing a scope to look for abnormalities in the esophagus, stomach, and first part of the small intestine. It is a particularly good technique to look at the mucous membranes of these body parts. PCS patients almost always get an ultrasound test done to evaluate

the liver, tracts that transport the bile, pancreas, and nearby areas. An ultrasound is a procedure that uses types of sound waves to produce images of the body.

Some PCS patients may be sent for a CT (computerized tomography) scan to assess the pancreas. CT scanning is a more advanced imaging technique that uses x-rays and computer technology to produce more clear and detailed pictures than a traditional x-ray.

A more invasive technique that is sometimes used to get a more detailed look of the tracts that transport the bile is known as endoscopic retrograde cholangiopancreatography (ERCP). This test involves the use of a scope that is placed in the body to obtain images. ERCP is considered the *most useful* for diagnosing PCS because it allows the best possible visualization of the relevant body structures such as the bile ducts.

An experienced doctor that performs an ERCP may also measure the changes in pressure in the tubes that carry the bile and in the ampulla (a rounded, sac-like widening) of these tubes. The measurement of pressure changes in the tubes that carry the bile is known as biliary manometry. The measurement of pressure changes in the ampulla is known as ampullary manometry.

A non-invasive way technique that is sometimes used is the [magnetic resonance cholangiopancreatography \(MRCP\)](#) test. This test produces two and three dimensional pictures of the tubes that transport bile and the tubes in the pancreas. It is usually used with patients who are not candidates for ERCP. Another technique that can be used for patients who are not ERCP candidates is PTC, which stands for percutaneous transhepatic cholangiogram. PTC is a way to visualize the tubes that transport bile by using X-rays.

Patients with pain in the lower belly usually get a barium enema. A barium enema involves placing a tube inside the patient's rectum (the last part of the large intestine) and inserting barium into the rectum through the tube. X-rays are then taken that produce pictures of the [colon](#). The colon is the major part of the large intestine, which is located in the belly. The large intestine absorbs moisture from the matter that is left after it is digested in the small intestine, and excretes the waste from the body.

WHAT OTHER TYPES OF TESTS MAY PATIENTS WITH PCS NEED TO GET?

An electrocardiogram (also known as an ECG and an EKG) may be ordered, which will provide information about the electrical activity that occurs before a heartbeat. This will help the doctor check for heart disease. Depending on the results of this test, the patient may be asked to undergo Holter monitoring and/or a stress test. Holter monitoring is a device that measures the electrical activity of the heart (usually for about 24 hours) while the person does normal activities. A stress test measures the reaction of the body (especially the heart and lungs) to controlled amounts of stress, such as the stress caused by exercise. The lungs are two organs in the body that help people breathe.

CAN PCS BE PREVENTED?

While it may not be possible to prevent PCS 100% of the time, the risk for developing it can be lowered. For example, the more certain the diagnosis is prior to the removal of the gallbladder, the lower the chance of developing PCS. Reducing the risk factors for PCS that are listed below will decrease the chance of developing PCS.

WHAT ARE THE RISK FACTORS FOR DEVELOPING PCS?

As mentioned above, one risk factor for developing PCS includes not being certain of the diagnosis prior to gallbladder removal. Another risk factor includes having an urgent gallbladder removal. In general, the longer that symptoms lasted prior to the gallbladder removal, the greater the chance of developing PCS. If the symptoms are present less than a year before gallbladder removal, 15.4 % of patients have been shown to develop PCS. If the symptoms last from 1-5 years, 21% have been shown to develop PCS. If the symptoms last from 6-10 years, 31% have been shown to develop PCS. And if the symptoms last for more than 10 years, 34% have been shown to develop PCS.

If the gallbladder is removed to treat gallstones, approximately 29% of patients develop PCS. If the surgery is not performed to remove gallstones, anywhere from 10 to 25% of patients develop PCS. If the common bile duct is cut open, in addition to gallbladder removal, 23% of patients develop PCS. If the common bile duct is not cut open and the gallbladder is removed, 19% of patients develop PCS. The common bile duct is a passageway that bile flows through that is formed by the connection of two other bile ducts that come from the liver and gallbladder.

Younger patients have generally been found to have an increased risk of developing PCS. For example, people ages 20-29 that had the gallbladder removed have been found to have a 43% chance of developing PCS, whereas 30-39 year olds have a 27% chance, and 40 to 49 year olds, have a 21% chance. The odds of getting PCS increase compared to 40-49 year olds when compared to people ages 50-69. That is, 50 to 59 year olds were found to have a 26% chance of developing PCS and 60-69 year olds were found to have a 31% chance of developing PCS. Interestingly, patients over age 70 were not found to develop PCS.

Females have been found to have a greater risk of developing PCS than males. Specifically, 28% of females were found to develop PCS compared to 15% of males. Another risk factor for PCS is having a psychiatric (mental health) disorder. About 50% of patients with a mental health disorder were found to develop PCS compared to patients without a psychiatric disorder (of which 23% developed PCS).