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Gallbladder Diseases

Patient and family information, brought to you by the Education Committee of APSA

Gallbladder diseases typically cover the following conditions:

Cholelithiasis (gallstones)

Choledocholithiasis (stones in the bile duct)

Cholecystitis (infection of the gallbladder)

The gallbladder is an organ located underneath the liver in the upper right part of the belly just below the ribcage. The liver makes bile and gallbladder normally stores bile. In response to a meal, the gallbladder releases bile released into the small intestine to aid in breaking down (digestion) of foods. The bile that travels through the intestines makes the stool yellow, green or brown. Here, we discuss conditions that can affect the gallbladder and how they are commonly managed.

Overview - “What is it?”

Up to 30% of the adult population have gallstones. *Cholelithiasis* refers to stones in the gallbladder (“gallstones”). Overall, gallstones are less common in children. Stones tend to form in the gallbladder when the bile has a higher concentration of cholesterol and bilirubin. Cholesterol is something that can be found in fatty foods and a diet has a high fat content can contribute to gallstone formation. Bilirubin is a substance that the body forms when the red cells in the blood are processed by the body. So, in conditions when there is a high rate of blood turnover, more bilirubin is made and needs to be handled by the liver. The bilirubin level is higher in the bile and can lead to gallstones. Conditions that have a high red blood cell turnover include occur for a variety of reasons. These conditions include *sickle cell anemia*, *hereditary spherocytosis* and *beta-thalassemia*. Up to 50% of children with sickle cell anemia will develop gallstones by 20 years of age.

There are other risk factors that seem to be associated with gallstone formation. In children and adolescents, obesity, pregnancy, use of birth control pills, and cystic fibrosis are risk factors for this problem. Over 40% of babies who needed to nutrition to be given through the vein (total

parenteral nutrition or TPN) will develop gallstones. Before puberty, gallstones are equally likely in boys and girls, but after puberty girls are more likely to have gallstones.

Cholelithiasis (*chole* – bile ducts, *lithiasis* – stones) is the condition when stones from the gallbladder get stuck in the bile duct between the gallbladder and the small intestine. This can cause yellowing of the skin (jaundice) and sometimes, an infection of the bile ducts and liver.

Cholecystitis is an infection of the gallbladder that can be associated with gallstones.

Signs and Symptoms - “What symptoms will my child have?”

Early signs include belly pain and/or nausea after eating, especially if the food is high in fat. The gallbladder squeezes bile after a meal, and having stones in the gallbladder can cause pain. The pain can be sharp or dull like an ache. It is usually the right upper side of the belly, just below the rib cage, or spread to the right shoulder or right middle back. Older children are better able to narrow down their symptoms. Younger children may have a hard time describing their pain, so making the diagnosis in young children can be tough.

Sometimes, small gallstones can come out of the gallbladder as the gallbladder squeezes. These stones can get stuck within the bile duct system between gallbladder and the small intestine. If this happens, a number of serious problems can happen. These include blockage of bile flow into the small intestine, causing jaundice, pale colored stools and dark brown urine. If the stones go even lower down in the bile duct, they can block the duct of the pancreas and cause inflammation of the pancreas (pancreatitis). Another possible complication is infection of the bile ducts (cholangitis). This infection can lead to high fevers.

Gallstones can lead to infections of the gallbladder. In this case, fever may accompany nausea, vomiting, and belly pain.

Diagnosis - “What tests are done to find out what my child has?”

Physical examination by a doctor

Blood tests: including white blood cell count to look for infection, blood test to check function of the liver and pancreatic enzymes to rule out pancreatic inflammation

Abdominal X-ray: only detects 30% of stones. Sometimes X-rays are done to make sure that there are no other possible causes of pain.

Ultrasound: best test to look gallstones. Ultrasound can also detect whether an infection of the gallbladder is present. If dilation of the bile ducts are seen, this may give a clue that stones are stuck in the bile duct. Most of the time, an ultrasound is the only test needed.

HIDA scan: (also known as cholescintigraphy or hepatobiliary scintigraphy) a test that outlines the path that bile follows. In this test, a tracer is injected into the blood of the child. Like bile, this tracer is taken up by the liver and is concentrated in the gallbladder, goes through the bile duct, and is emptied to the small intestine. If the patient has infection of the gallbladder, the tracer may not go to the gallbladder. If there is a blockage of the bile duct, then the tracer won't go into the small bowel. This test is not used commonly since ultrasound is effective.

CT scan: not helpful for diagnosis gallstones in children. If other problems are being checked out or if there is worry of pancreatic inflammation, a CT may be useful.

Treatment - "What will be done to make my child better?"

Medical Options: There are very few medical options to treat gallstones.

- Ursodeoxycholic acid is a medicine that may be given to dissolve gallstones, but there is a high risk that the gallstones will come back.
- Decreasing risk factors to prevent gallstone formation is helpful. In infants, limiting the use of TPN may help with gallstone formation. In older children, preventing obesity with a healthy diet low in fat and regular exercise is helpful.
- Observation without intervention is indicated if there are no symptoms from gallstones. Sometimes, gallstones stones caused by TPN can resolve within 6-12 months.

Endoscopy: If doctors think that there are stones stuck in the bile duct (choledocholithiasis), they may recommend a procedure to remove the stones first. The procedure is called **Endoscopic Retrograde CholangioPancreatography (ERCP)**. An ERCP involves using a telescopic camera inserted through the mouth, passed through the stomach and the small intestine. Since the bile duct empties into the small intestine, the duct can be seen and approached in this region. To remove the stone, a small cut is made at the entry site of the duct (sphincterotomy) and small balloons are used to clear stones from the duct. The stones go into the small intestine and is naturally passed through the stool.

Surgery: Surgery is the best and only treatment for gallstones that cause symptoms. The gallbladder and the stones within it are removed. Commonly, the surgery is done laparoscopically. In laparoscopic surgery, several small cuts (incisions) are made. Through one of the cuts, a video camera is placed. The surgery itself is done using small instruments placed through the other incisions. Sometimes, the surgeon might think that it is a good idea to define the bile duct anatomy. This is done by injecting dye into the bile ducts. This may show if there are stones in the duct or if there is injury to the bile duct. If stones are found in the duct, the surgeon may do maneuvers to clear the duct. If the duct cannot be cleared at the time of the operation, an ERCP may be necessary after surgery.

Although most gallbladder removal surgeries are done laparoscopically, there may be times when a big incision is necessary. Some of the reasons for this include too much inflammation, inability to clear the duct using laparoscopy, or the anatomy of the gallbladder and the bile duct is not clear.

Preoperative preparation consists of care to make your child as healthy as possible before surgery. If gallbladder infection is present, your child may be given antibiotics before surgery is completed. In the case of the child with sickle cell anemia, blood transfusions may be required before surgery to prevent a sickle cell crisis. Patients are usually asked to shower or bathe on the night before surgery. Patients are asked to stop eating or drinking for a few hours before surgery.

Postoperative care consists of pain management and wound care. If the procedure is done laparoscopically, most children can go home on the day of the surgery or the following day. If a bigger incision is needed, there is more pain and so the patient needs to stay the hospital longer, with an average of 5-7 days after surgery.

Risks of ERCP include pancreatic inflammation, bleeding from sphincterotomy site (cut from the bile duct opening), hole in the intestine. Pancreatic inflammation usually gets better in 24-48 hours. Bleeding from sphincterotomy site may require another ERCP or surgery. A hole in the intestine can be managed with antibiotics alone or may need surgery depending on how big the hole is and how sick the patient is.

Risks of laparoscopic cholecystectomy include damage to the common bile duct, leakage of bile, bleeding, wound infection, retained stone in the bile duct. Whenever laparoscopic surgery is performed, there is always a chance that the surgery may be converted to open surgery (larger incision in the abdomen). Some of these complications can require further surgery.

Benefit of surgery is relief of pain from gallstones. If infection and/or bile duct blockage is presents, these problems are also solved.

Home Care - "What do I need to do once my child goes home?"

Diet: Your child may eat a normal diet after surgery. Sometimes, eating lots fatty foods may result loose stools and cramping. These problems will likely go away after several months as the body adjusts to not having a gallbladder.

Activity: Your child should avoid strenuous activity and heavy lifting for the first 1-2 weeks after laparoscopic surgery, 4-6 weeks after open surgery.

Wound Care: Surgical incisions should be kept clean and dry for a few days after surgery. Most of the time, the stitches used in children are absorbable and do not require removal. Your

surgeon will give you specific guidance regarding wound care, including when your child can shower or bathe.

Medicines: Medicines for pain such as acetaminophen (Tylenol) or ibuprofen (Motrin or Advil) or something stronger like a narcotic may be needed to help with pain for a few days after surgery. Stool softeners and laxatives are needed to help regular stooling after surgery, especially if narcotics are still needed for pain.

What to call the doctor for: Call your doctor for worsening belly pain, fever, vomiting, jaundice or if the wounds are red or draining fluid.

Follow-up care: Your child should follow-up with his or her surgeon 2-3 weeks after surgery to ensure proper post-operative healing. You should continue to see your pediatrician regularly to address and manage the primary cause of your child's gallstones (examples: obesity, hemolytic anemia, cystic fibrosis)

Long Term Outcomes - "Are there future conditions to worry about?"

After surgical treatment, the long-term prognosis is excellent.

Few patients may feel like vomiting and bloated after eating fatty foods. This is usually temporary. Follow-up with your pediatric surgeon if your child experiences these symptoms.

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