

Portosystemic Shunts

ABOUT THE DIAGNOSIS

Portosystemic shunts are birth defects involving the blood's circulation through the liver. They cause symptoms of poor growth and neurologic dysfunction. Treatment for portosystemic shunts that have been present since birth (the majority) is usually via surgery, though some patients can be managed long-term without surgery.

Portosystemic shunts result from abnormal blood vessels that divert blood from the portal system of the liver to the veins of the rest of the body and thus bypass the liver. The portal system is a division of the blood circulation that collects blood from the intestines and carries it to the liver, where toxins and nutrients are removed before it enters the general circulation. Normally, intestinal bacteria produce toxic substances, such as ammonia, that are absorbed into the blood and then detoxified in the liver. When this blood bypasses the liver through a portosystemic shunt, these toxins that are normally removed by the liver are allowed to circulate in the bloodstream. Most portosystemic shunts are *congenital*, that is, they are abnormalities that develop during fetal growth and are present at birth. As a result of the lack of normal blood flow from the portal system, the liver does not develop properly in these pets and remains abnormally small. Occasionally, portosystemic shunts develop later in life due to chronic, advanced liver disease.

Most pets with congenital (meaning they were born with the abnormal vessel) portosystemic shunts show symptoms within the first 6 months of life. The vast majority show symptoms before 2 years of age, but a few are not detected until later in life. Toxins in the bloodstream can cause a variety of the nervous system signs that first indicate the possible presence of a portosystemic shunt. These symptoms can include poor appetite, lethargy, disorientation, pacing and circling, seizures, coma, and other changes in behavior. Excessive drooling can also occur jointly with these symptoms and is especially common in cats with portosystemic shunts. These symptoms usually wax and wane, and are often worse after meals. The pet may be stunted in growth or fail to gain weight. Diarrhea or vomiting may occur intermittently. Affected pets may drink and urinate more than normal. Pets with portosystemic shunts are also prone to developing a specific type of kidney and bladder stones. Symptoms of uroliths (urinary tract stones) include straining to urinate, frequent urination, or bloody urine. A common scenario that leads to suspicion of portosystemic shunt is delayed recovery from anesthesia, such as after neutering. Any difficult or delayed anesthesia recovery in a young dog or cat should prompt the consideration of portosystemic shunt.

There are many other types of diseases that can produce clinical signs that are easily mistaken for symptoms of portosystemic shunts. Therefore, it is necessary to perform certain tests to confirm the diagnosis of portosystemic shunt; a physical examination alone is not sufficient to be sure that a portosystemic shunt is or is not present. Routine blood tests and urinalysis are necessary. They may show some changes that indicate poor liver function but generally these tests are more valuable for screening for other, "impostor" diseases with symptoms that mimic portosystemic shunts. Specialized tests of liver function will almost always be abnormal. The most common of these is a blood test for the measurement of serum bile acids. Radiographs (x-rays) may indicate an abnormally small liver. Abdominal ultrasound examinations can allow visualization of the portosystemic shunt in some patients. Radiographic techniques using special dyes administered during surgery are needed to locate the

portosystemic shunts in other pets. The most definitive and reliable test to determine the presence and location of a portosystemic shunt is computed tomography (CAT scan).

LIVING WITH THE DIAGNOSIS

Successful surgical treatment of congenital portosystemic shunts can lead to the pet living a normal life. Without surgery, some dogs can be managed with medication alone for months to years, while in others, the medication is not sufficient to control the problem. Cats are less likely to have their symptoms controlled by medication alone.

When portosystemic shunts first arise later in life (*acquired* portosystemic shunts), they do so as a result of chronic liver disease such as cirrhosis. In such cases, surgical closure of the shunts is not performed, and the priority rests on treatment of the underlying problem, usually with medications chosen based on a liver biopsy result.

TREATMENT

In most cases of congenital portosystemic shunts, the treatment of choice is surgery. Many affected pets will have complete resolution/disappearance of symptoms after the portosystemic shunt is permanently closed during surgery. The shunt cannot always be corrected surgically, however. Some are in locations, such as within the liver tissue, where they cannot be reached. Others cannot be closed off completely because the blood pressure in the portal system becomes too high. Prior to surgery or in pets that cannot be treated surgically, medications may be adequate to control symptoms for months to years. Such treatment includes feeding a protein-optimized diet, giving antibiotics to reduce bacterial toxins originating from the intestinal tract, and giving lactulose to reduce the absorption of ammonia. Usually, surgery (or even minimally invasive techniques that don't require a large incision) is performed by a veterinary specialist. Your veterinarian can help you find one to help, or you can check at www.ACVS.org in North America, or www.ECVS.org in Europe.

DOs

- Continue medications and protein-optimized food after surgery until instructed to stop by your veterinarian.
- Following surgery, restrict your pet's exercise until sutures (skin stitches) are removed.

DON'Ts

- Avoid feeding high-protein diets or snacks, especially meat-based foods and treats.
- Following surgery, do not bathe your pet until skin sutures (stitches) have been removed.

WHEN TO CALL YOUR VETERINARIAN

- If your pet's symptoms worsen (see [Signs to Watch For, below](#)).

SIGNS TO WATCH FOR

- Changes in behavior, lethargy, or lack of appetite
- Straining to urinate, frequent urination, or blood in the urine
- Vomiting, diarrhea, excessive drinking or urination

ROUTINE FOLLOW-UP

- After surgery several visits will be needed to monitor your pet's response.

ADDITIONAL INFORMATION

- Portosystemic shunts are more common in certain purebred dogs than mixed-breed dogs, with miniature schnauzers, Yorkshire terriers, Maltese terriers, and Havanese dogs particularly over-represented. Purebred cats are at lower risk than mixed-breed cats.

Other information that may be useful in some cases: "How-To" Client Education Sheet:

- How to Manage a Pet That Is Having Seizures

Practice Stamp or Name & Address

Also available in Spanish.