

PORTOSYSTEMIC SHUNTS

What is a portosystemic shunt?

A portosystemic shunt occurs when the blood from the intestines (carried by the portal vein) enters into the systemic circulation without first passing through the liver. This becomes a problem because the liver normally filters the toxins contained in the portal blood before it passes to the rest of the body's circulation. Portosystemic shunts are named for the abnormal blood vessel connections that occur (portocaval shunt, portoazygous shunt, portosplenic shunt, etc).

What are the clinical signs associated with portosystemic shunt?

There are a wide range of clinical signs that occur in dogs with portosystemic shunts. The most common signs, typically seen by 6 months of age, include stunted growth, weight loss, vomiting, diarrhea, lethargy and sometimes neurologic signs (seizures, disorientation).



Figure 1: Typical small stature and stunted growth of a depressed, lethargic puppy affected with a portosystemic shunt.

Neurologic signs result from a condition called hepatic encephalopathy in which toxins from the blood stream are not properly filtered by the liver and affect the brain. Pets who have portosystemic shunts also commonly develop urinary stones as a result of elevated ammonia levels in their bodies. Therefore, increased urination or straining to urinate can also occur. Some pets have all of these signs while others just have one.

What causes a portosystemic shunt?

A shunt away from the liver is normal during fetal growth, but is expected to close within a few days after birth. There are congenital shunts which stay open after birth and acquired liver shunts which usually result from diseases of the liver like poisons, hepatitis, inflammation, etc. Breeds at risk for developing portosystemic shunts include Yorkshire Terriers, Cairn terriers, Maltese, Irish wolfhounds and some purebred cats. In both congenital and acquired portosystemic shunts, blood is not properly detoxified before passing into the rest of the rest of the circulation and leads to toxin accumulation in the body.

How is a portosystemic shunt diagnosed?

Several diagnostic tests may be performed to support the diagnosis of a portosystemic shunt, including blood tests, urinalysis, and imaging tests. X-ray, ultrasound, portograms (a dye study that images blood vessels to the liver, Figure 2) or nuclear scintigraphy (a nuclear scan that measures liver blood flow) are all often used in the diagnosis of portosystemic shunts. Even with all of these tests, surgery may still be required to confirm the diagnosis.

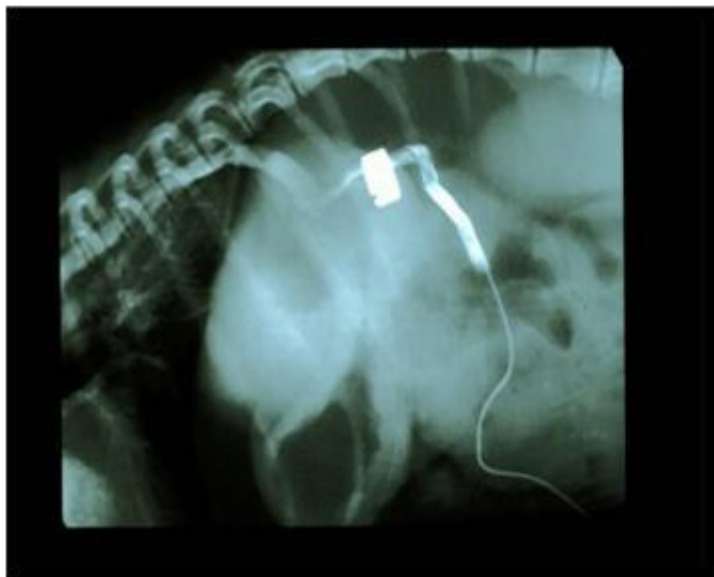


Figure 2: Portogram - an injection of dye into the portal system (blood supply to the liver) illustrating the appearance of a portosystemic shunt. This shunt has had an ameroid ring placed around it.

How is a portosystemic shunt corrected?

Although some pets can respond to medical management (low protein diets formulated for dogs with liver disease) and medications to protect the liver and to help reduce neurologic signs, surgery is typically required for a successful outcome for single shunts. Prior to surgery, a low protein diet and sometimes antibiotics will

be started. During surgery, the shunt is identified and one of several procedures can be performed to close the shunt. The most common repair method involves placing a small metallic ring called an ameroid constrictor across the shunting vessel (Figures 2, 3 and 4). This constrictor closes the shunt gradually. Another method of shunt repair involves placing a cellophane band around the shunting vessel. If multiple shunts are found, surgical correction cannot be performed, and pets are managed with the above medical therapies. In some cases the shunting vessel is “intrahepatic” (inside of the liver) and cannot be ligated with the above methods. Bile acids should be monitored after surgery. Once the values have normalized, a pet should be returned to their normal diet.



Figure 3: Appearance of an ameroid constrictor

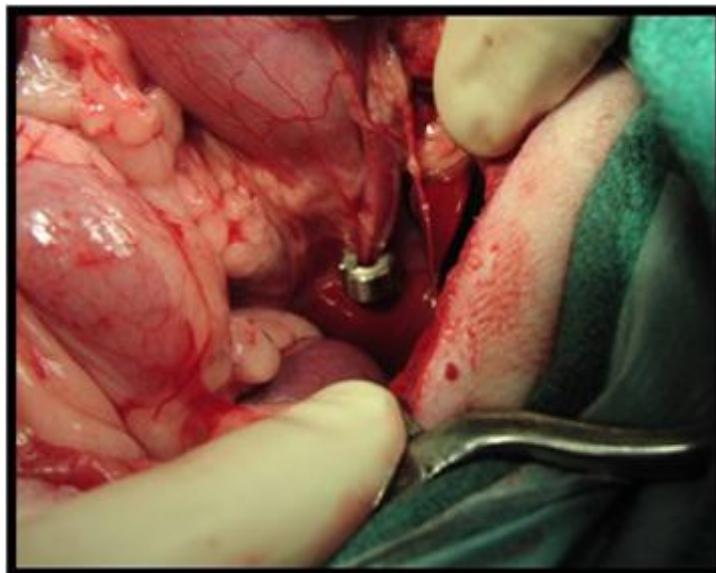


Figure 4: Intraoperative placement of an ameroid constrictor around a shunting vessel.

What is the prognosis associated with portosystemic shunts?

Prognosis of a dog with a portosystemic shunt is affected by many factors. These factors include success of medical management, the shunt's location, and if there are multiple acquired shunts or a single extrahepatic shunt. Medical management alone in dogs typically has a poor prognosis due to development of neurologic and liver problems. If the shunt is ligated completely and the recovery is uneventful after surgery, the prognosis is very good. Cats are typically less responsive to surgery and are also more likely to have continued neurologic signs in the postoperative period. After surgery, pets must remain in the hospital on IV fluids and be monitored for seizures and development of hypoglycemia (low blood sugar levels).

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