

# WHEN A SMALL VESSEL CAUSES BIG PROBLEMS

## CONGENITAL PORTOSYSTEMIC SHUNTS

A single congenital portosystemic shunt is an abnormal blood vessel that diverts blood from the liver to the heart and general circulation. In fetal puppies, a variety of vessels fuse to form different parts of the liver and the blood vessels in the abdomen. In some puppies, the vessels can join in abnormal ways, forming the shunting vessel. When these vessels remain open after birth, affected animals will develop clinical signs of a portosystemic shunt.

Animals that have portosystemic shunts are often smaller than their siblings. They can have bouts of depression, confusion, blindness, weakness, poor balance and even seizures. Some will develop urinary tract infections and stones, while others have intermittent vomiting and diarrhea. Most will show these signs by six months of age, though occasionally animals are not diagnosed until they are much older.



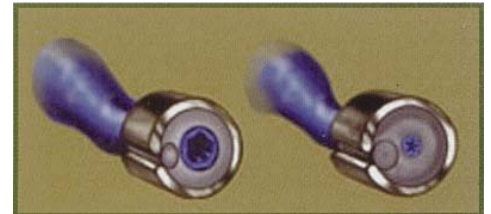
*Yorkshire Puppy with Shunt*

Because their liver function is poor, animals with congenital shunts will have low blood protein and albumin, and increased bile acids and ammonia. Results of liver biopsy may be suggestive of a shunt but cannot differentiate this condition from another congenital disease: hepatic microvascular dysplasia. A definitive diagnosis of a liver shunt requires special testing: ultrasound, a nuclear scan (scintigraphy), an x-ray study of the liver blood vessels (portography), or exploratory surgery.

Initial treatment for congenital shunts includes lowering the protein in the diet and controlling any infections. Once the patient is stable, surgery provides the best chance for long-term improvement. Most shunts are "extrahepatic," meaning they are located outside of the liver, and experienced veterinary surgeons can find them during abdominal exploration. The shunt is encircled with a suture or constricting device such as a cellophane band or an ameroid constrictor. These constrictors close the shunt off over several weeks, gradually allowing more blood to flow back into the liver. Complication rates of surgery are greatly decreased with the use of constrictors, and about 85% of dogs are clinically normal six months after surgery.

Large breed dogs such as Labrador retrievers and Irish wolfhounds tend to have "intrahepatic" shunts, where the vessel is hidden inside of liver tissue. Surgical ligatures or vascular coils are used to close the shunt partially or completely in these patients.

Closure of intrahepatic shunts is more complicated than extrahepatic shunts; however, 70-75% of surgically treated animals will improve dramatically within months after surgery.



*Ameroid*



*Ameroid Constrictor Placement*

Development of shunts is caused by hereditary factors in many animals. Yorkshire terriers are the breed most commonly affected with single congenital shunts. In fact, the risk of a Yorkshire terrier having a congenital shunt is 59 times greater than (mixed breed dogs, and 36 times greater than all other breeds combined). The method by which the genes are transmitted, however, is still unknown. Animals that have shunts should be neutered, and inbreeding of affected lines should be avoided.

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