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PORTOSYSTEMIC SHUNT (LIVER SHUNT)

What is it? A portosystemic or liver shunt is an abnormal vessel connecting the portal vein (the vein that brings blood back from the intestines to the liver for filtering) with, most commonly, the vena cava (the main blood vessel that returns blood to the heart). This abnormality is a problem because by bypassing the liver it deprives the liver of the nutrients it needs to grow normally, and it also allows “unfiltered” blood (high in ammonia) to get into the general circulation. These shunts can be single or multiple vessels. They can also occur outside of the liver tissue (extrahepatic) or within the liver tissue (intrahepatic).

What animals are affected? Single, extrahepatic shunts are most commonly seen in small breed dogs. Yorkshire Terriers are quite common, but other breeds can be affected as well. Single, intrahepatic shunts are more common in larger breed dogs such as Labrador retrievers. Multiple extrahepatic shunts are most commonly seen in dogs with liver disease resulting in portal hypertension (cirrhosis).

What are the signs? Signs can vary greatly from animal to animal, but the classic signs are that of a “poor doer” or runt. They tend to be small in stature, may tire easily, or may show neurologic signs (head pressing, wobbliness, dementia, seizures), particularly after eating. Dogs with liver shunts may also develop urinary calculi (specifically urate stones), and may present with signs related to this—difficulty urinating, blood in the urine. Some dogs show virtually no signs, and the abnormality is discovered on routine blood work. Hypersalivation can be seen in cats.

How is it diagnosed? Classic signs on blood work include a low BUN (blood urea nitrogen), elevated AlkPhos (a liver enzyme) and elevated bile acids (a test of liver function). They may also have hypoalbuminemia (low blood protein). Radiographs of the abdomen may reveal a small liver. Ultrasound of the abdomen can confirm the presence of bladder stones, show poor vascularity (presence of normal blood vessels) within the liver, and sometimes can even identify the shunt vessel. Portograms (x-rays taken after dye has been injected into a blood vessel coming from the intestines or spleen) can identify the shunt as well. Nuclear scintigraphy is another test that can be done to document the presence of a shunt.

How is it treated? Medical management includes a low protein diet, antibiotics, and lactulose (a drug that helps draw fluid into the colon and helps the animal excrete the excess ammonia in its bowel movements). This treatment is commonly started preoperatively. Single, extrahepatic and intrahepatic shunts are treated by surgically attenuating or ligating the shunt vessel. This treatment usually has to be done gradually with either a partial suture ligation (partially tying off the vessel), an ameroid constrictor (a ring shaped device that is placed around the vessel and gradually swells overtime to then effectively occlude or block the vessel), or a cellophane band (a strip of cellophane that is placed around the vessel only partly occluding it—over time the tissue reaction that occurs occludes the vessel the rest of the way). This treatment forces the blood to go from the intestines and through the liver before it reaches the systemic circulation. Unless there are other problems with the liver, it will then grow to a more normal size and the other clinical signs will improve or resolve. This process is done gradually because if the shunt is closed completely too quickly, it can create portal hypertension as the liver cannot yet handle the new blood flow. Intrahepatic shunts can be much more difficult to identify and ligate. Multiple extrahepatic shunts are treated medically.

What after care is needed? Dogs usually remain hospitalized overnight or for a couple of days depending on their recovery from anesthesia. Normal postoperative care, restricted activity and monitoring of the incision, is done at home. Medical management is typically continued until the shunt vessel has time to become occluded and the liver time to adapt to the new blood flow. Bile acid levels are rechecked about 3 months after surgery to assess liver function. Some dogs may require a second surgery for complete occlusion of the shunt vessel if it cannot be safely treated or does not fully occlude after the first procedure. Some dogs may need to remain on the low protein diet if they have concurrent liver disease. Dogs with severe neurologic signs before or after surgery may require anticonvulsant medications to control seizures.

What is the prognosis? Prognosis is quite good if the patient survives surgery and the initial postoperative period. Complications can occur during and after surgery such as hemorrhage, portal hypertension, and seizures that can result in a more guarded prognosis, but most dogs respond well. Some dogs with concurrent liver disease (namely microvascular dysplasia—a lack of normal blood vessels within the liver) will require continued medical management. Prognosis in cats is typically less favorable.

Can it be prevented? Portosystemic shunts can only be prevented by not breeding affected dogs and by removing the dam and sire of affected dogs from the breeding population. We strongly recommend spaying and neutering affected dogs. Some acquired, multiple extrahepatic shunts *may* be prevented if liver disease is recognized early and treated appropriately, but doing so can be difficult.

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