

## **Puppies that don't play in the Summer....**

Spring and summer bring new puppies into our homes and playing and outdoor activity increases with the warm weather. **But what if your new puppy does not want to play?**

What if your new puppy is always tired and sluggish? Puppies are sometimes born with congenital abnormal vessels known as portosystemic shunts. These shunts carry intestinal blood away from the liver preventing the liver from detoxifying the blood before it reaches the rest of the body. The toxins can result in clinical signs such as lethargy, weight loss, depression, inactivity, stuporous episodes, head pressing, weakness or staggering, vomiting and diarrhea, increased urinations and water intake, diarrhea and sometimes seizures.

Porto systemic shunts are common in toy breeds such as the Yorkshire terrier, Shih Tzu, Maltese, and Lhasa Apso. They are also seen in large breed dogs such as Golden retrievers, and Labrador retrievers. The toy breeds most commonly have single extrahepatic shunts (outside the liver) and large breeds more commonly have an intrahepatic shunt (inside the liver). Sometimes multiple shunts or microvascular dysplasia (multiple microvascular shunts within the liver vasculature) can also be present.

Certain abnormalities in laboratory work can make one suspicious of portosystemic shunts. Hematology abnormalities include decreased red blood cell count, and an increased white blood cell count. Serum abnormalities can include increased liver enzymes, decreased BUN (blood urea nitrogen), decreased protein, cholesterol and potassium. Blood clotting times may also be prolonged. Specific liver function tests that are usually increased include ammonia and bile acids. The bile acid test is a liver function test and puppies with a shunt will typically have an increase in the fasting value and in a blood sample that is taken 2 hours after eating. Definitive diagnosis can be confirmed with a portogram (a dye study that identifies the abnormal vessel) scintigraphy, or exploratory surgery. Diagnosis by ultrasound is occasionally possible but is very difficult and is operator dependent.

Portosystemic shunts can be surgically corrected, but the prognosis is best when the surgery is performed at less than one year of age. The most common surgical correction is an ameroid ring constrictor. The ameroid ring is a circular device that is placed around the abnormal vessel and gradually closes the shunt over several weeks. Other methods for correction of extrahepatic shunts include partial or complete closure with suture or cellophane. Sometimes intrahepatic shunts are corrected with coils that are released within the vessel and cause a clot to form, and the vessel becomes closed.

Puppies treated surgically before one year of age often do well and can lead a relatively normal life. A low protein diet is often recommended for the remainder of the puppies' life. If the patient is over three years of age when the shunt is diagnosed medical treatment may be the best option. If multiple shunts are diagnosed, or if surgery is not an option for other reasons, then medical treatment is recommended. Medical treatment

includes feeding a low protein diet, as well as giving lactulose and antibiotics to decrease intestinal bacterial overgrowth. Dogs between 1 and 3 years of age are in the range that surgery may be helpful or harmful depending on the patients' liver development.

Medical treatment may resolve clinical signs in some patients for an undefined time period. As the dog gets older, clinical signs may reoccur and worsen and ultimately result in liver failure.

For the best prognosis, early diagnosis and surgery is recommended to give the sluggish puppy a normal life.

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