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Patent Ductus Arteriosus (PDA)

What is Patent Ductus Arteriosus?

The ductus arteriosus is a blood vessel that connects the vessel going from the heart to the lungs (pulmonary artery) to the vessel going from the heart to the body (aorta) in the fetus. During fetal development the lungs are non-functional, therefore blood is diverted from the pulmonary artery, away from the developing lungs, through the ductus arteriosus into the aorta. The ductus normally closes at the time of birth or within a few days after birth. If the vessel remains open or patent, a heart-lung circulatory abnormality develops that leads to volume overload heart failure prior to the patient reaching 9 months of age. PDA is the most common congenital heart defect in dogs, but is also found in cats. Breeds that are commonly affected include the Maltese, Pomeranian, Shetland Sheepdog, Keeshond, Bichon Frise, English Springer Spaniel, Poodle, and Yorkshire terrier.

Diagnosis and Staging

Most puppies appear to be normal at a very young age, but with increasing age they begin to grow more slowly, develop exercise intolerance, may cough, and/ or a vibration may be noted over the chest. Most cases are diagnosed during the first puppy visit with a veterinarian as the pups have a specific type of heart murmur (machinery-like). The murmur and sometimes palpable chest vibration are caused by turbulent blood flowing through the PDA. Chest x-rays are utilized to evaluate changes in the heart size, chest blood vessels, and lungs. A definitive diagnosis of PDA is made by a cardiologist performing an echo cardiogram (heart ultrasound) during which the abnormal vessel can be visualized. The cardiologist also looks for other cardiac abnormalities and evaluates heart function.

Treatment

Treatment for a PDA is open chest surgery and ligation (tying off) of the PDA with suture material or closed chest cardiac catheterization through a rear limb vessel with implantation of an intravascular (inside the vessel) occlusion device (PDA coil). Occlusion of the PDA immediately stops the abnormal shunting of blood away from the lungs restoring a normal circulatory pattern. Without surgical repair, a PDA will cause death in over 70% of puppies before one year of age. The long-term prognosis with surgical correction is good to excellent. However, if early heart failure has developed prior to correction, some changes can be permanent even after PDA occlusion.