



Patent Ductus Arteriosus (PDA)

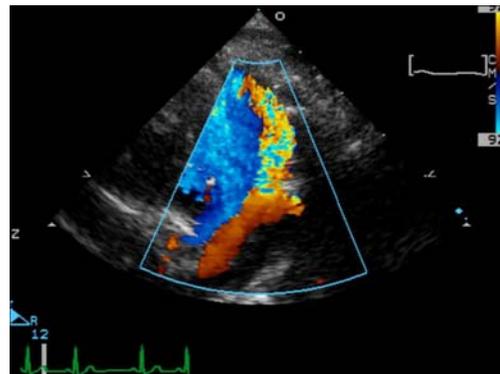
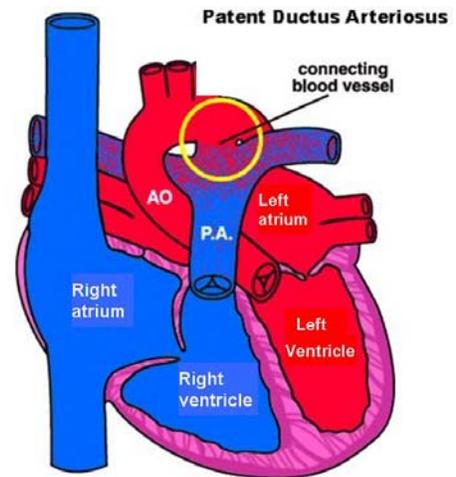
Understanding patent ductus arteriosus (PDA)

The ductus arteriosus is a normal fetal structure connecting the pulmonary artery (blood supply to the lungs) to the aorta (blood supply to the body) that closes shortly after birth in a normal individual. In some newborns, the ductus fails to close and abnormal blood flow from the high pressure aorta (left side) to the low pressure pulmonary artery (right side) is established through this *patent ductus arteriosus (PDA)*. Left-to-right shunting PDA can occur in any dog or cat but is more commonly seen in the following dog breeds:

- *Bichon Frise*
- *Chihuahua*
- *Cocker Spaniel*
- *Collie*
- *English Springer Spaniel*
- *German Shepherd*
- *Keeshond*
- *Labrador Retriever*
- *Maltese*
- *Newfoundland*
- *Poodle*
- *Pomeranian*
- *Shetland Sheepdog*
- *Yorkshire Terrier*

Consequences of a PDA

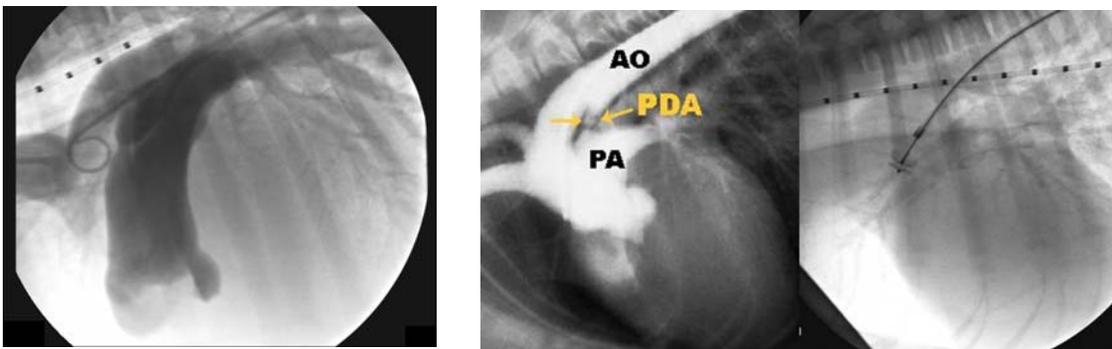
The presence of a PDA allows for large volumes of blood to flow from the aorta to the pulmonary artery and lungs, which results in a significant volume overload to the left side of the heart. This can lead to circulatory congestion and leakage of fluid into the lungs, a syndrome known as *congestive heart failure (CHF)* (for more information see our educational brochure *Heart disease and congestive heart failure*). With most PDAs this occurs within the first few years of life. The large



volume of flow can also lead to irreversible pulmonary vascular disease and pulmonary hypertension. Occasionally, very small PDAs are identified which are not expected to cause a problem until later in life, if at all.

Diagnosis

Detection of a PDA most commonly occurs following auscultation of a loud, machinery quality heart murmur at the left heart base on physical examination in a young animal. Echocardiography (cardiac ultrasound) by a veterinary cardiologist is required to confirm the diagnosis and characterize the amount of flow across the PDA as well as assess cardiac structure and function. Chest radiographs (x-rays) help determine if any active congestive heart failure is present.



Treatment

Definitive closure via transcatheter device placement or surgical ligation is the primary treatment for a left-to-right PDA in addition to treatment of active congestive heart failure, if present. Transcatheter device placement is performed by a veterinary cardiologist and is considered minimally invasive. During this procedure, a long vascular catheter is advanced into the region of the PDA via a peripheral artery and used to perform an angiogram, or contrast injection, into the PDA to assess its size and shape. Then a second catheter is used to deploy a PDA closure device (ductal occluder or Gianturco coil) under fluoroscopic (real-time x-ray imaging) guidance. Surgical ligation is another option for closure but requires open-chest surgery.

Prognosis

If left untreated, most PDAs lead to congestive heart failure within the first few years of life and the prognosis is poor. In most cases the PDA is diagnosed early in puppyhood and cardiac function is well preserved, such that definitive closure is curative and the prognosis is excellent for the patient to live a completely normal life. Occasionally, permanent cardiac dysfunction is present which may alter an individual's prognosis. In rare cases where pulmonary hypertension has developed and a reversed, or right-to-left PDA is present, closure is contraindicated and overall prognosis is poor.