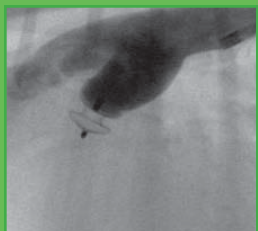
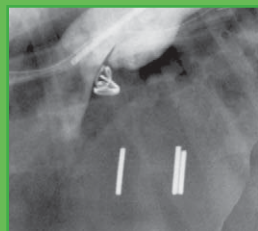


How do interventional catheterization procedures work?

During these procedures, one of several different devices is deployed in the PDA resulting in physical obstruction of the PDA. The device is left in place for the duration of the patient's life, and has not been associated with any long-term complications.

What SPECIAL CARE is needed once my dog is home from surgery?

It is important that the incision(s) be kept clean and dry. Do not allow your dog to lick or chew at the incisions. An Elizabethan collar should be placed around the neck to prevent licking or chewing, especially if the dog is going to be left alone. Do not allow your dog to play and rough house until the incision(s) are completely healed. This takes about 10–14 days. The sutures are typically buried beneath the skin, and will dissolve on their own. Occasionally, they will need to be removed by your veterinarian. A special diet is not required unless indicated by your doctor.



Angiograms of PDA occluded with a coil, a plug, and a canine duct occluder.

Will my dog's heart return to normal?

In most cases, if clinical signs were present, they improve dramatically once the PDA is closed. The heart may return to normal size with time, but enlarged hearts may not completely return to normal. A recheck echocardiogram of the heart is recommended **1–3 months** after surgery to monitor heart size and function.

Why is there a heart murmur present after surgery?

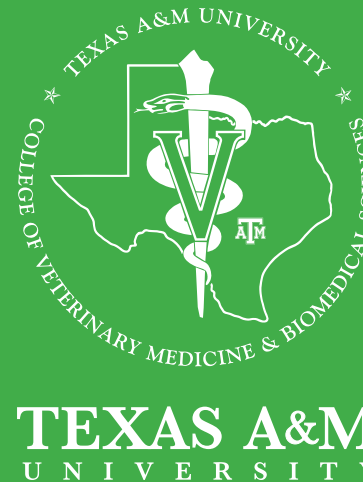
In dogs with big hearts, the mitral valve leaflets in the left side of the heart stretch apart causing a leak called **mitral regurgitation**. This will result in a murmur that is often heard even after the PDA is closed, and that may go away with time as the heart returns to normal size. In a small number of patients, this type of murmur may persist indefinitely.

Should a dog with a PDA be used for breeding purposes?

PDA is considered a heritable disease that can be passed to puppies.



To find out about Matteo's story, visit: cvm.tamu.edu/vscs/cardiology/testimonials



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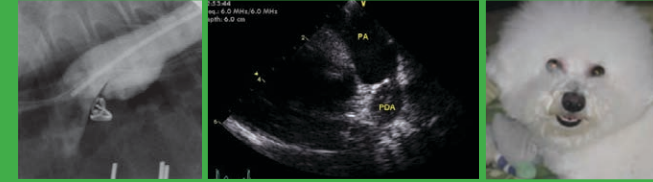
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Tel 979.845.2351

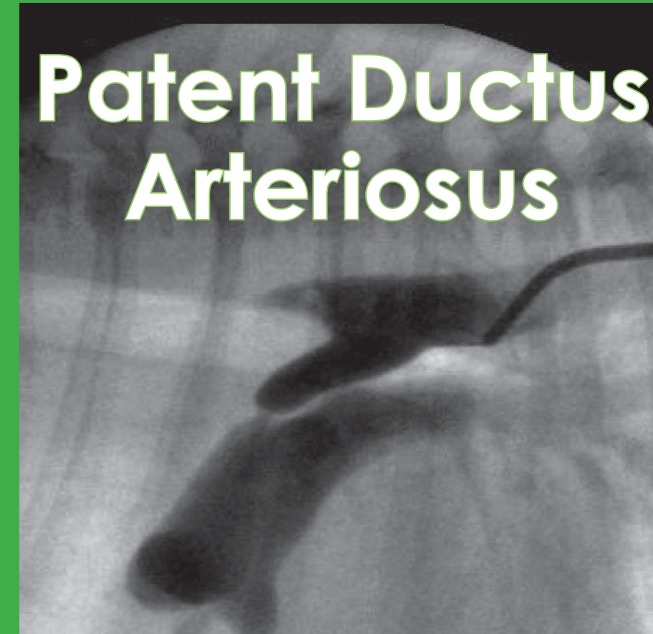
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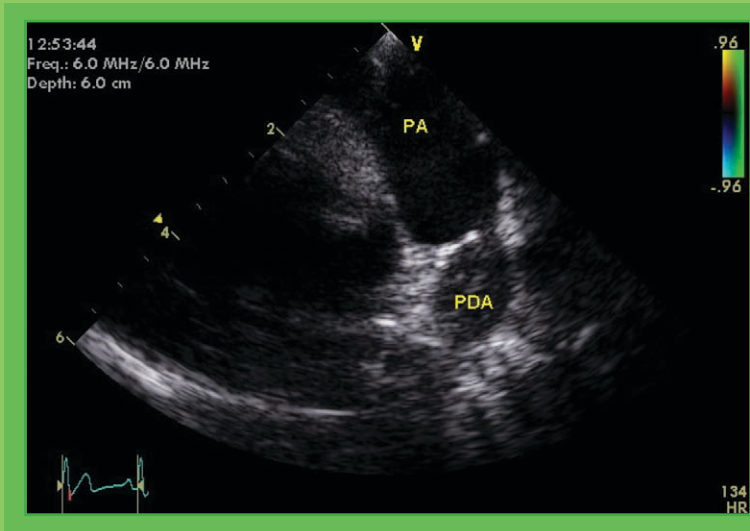
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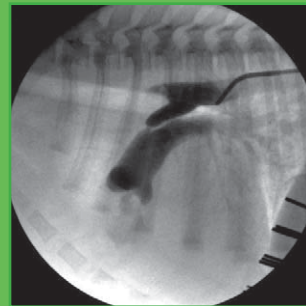
Patent Ductus Arteriosus



Texas A&M University
Veterinary Medical
Teaching Hospital
Cardiology



Ultrasound image of a PDA.



Angiogram of a PDA.

What is a PATENT DUCTUS ARTERIOSUS?

Patent ductus arteriosus (PDA) is one of the most common congenital heart defects in dogs. PDA occurs more frequently in certain breeds of dogs including poodles, Shetland sheepdogs, collies, German shepherds, Maltese, Bichon Frisé, Chihuahuas, Pomeranians and Newfoundlands. It is present more commonly in females than males. The **ductus arteriosus** is a blood vessel that is normally present in a puppy before it is born. At birth or within a few days of birth, the ductus arteriosus should close allowing blood to begin flowing through the lungs to pick up oxygen. If the ductus arteriosus does not close, it results in an abnormal communication between the two largest vessels in the heart, the **aorta** and the **pulmonary artery**. This

causes an increase in the amount of blood that flows through the left side of the heart, resulting in extra work for the left side of the heart. The increased volume of blood and extra work can cause heart failure.

How is a PDA diagnosed?

Blood flowing through the PDA causes a characteristic heart murmur typically heard at your puppy's first visit to the veterinarian. Xrays of the chest may show heart enlargement. An echocardiogram is required to definitively diagnose PDA.

What are the clinical signs of a PDA?

Exercise intolerance, cough and breathing difficulty are the most common signs. Many dogs have no clinical signs at the time of initial diagnosis.

What are the treatment options for a PDA?

Interventional Catheterization Procedures

With these minimally-invasive procedures, a small incision is made in the right inner-thigh and a catheter is placed into an artery in the leg. The catheter is advanced into the aorta and PDA. A dye injection is made (**angiogram**) allowing precise determination of the size and shape of the PDA. Then a device (coil, plug, or canine duct occluder) is placed into the PDA to stop blood flow. Occasionally, the PDA is a shape (short or tubular) that precludes the use of interventional catheterization procedures.

Surgical Ligation

This procedure is performed by making an incision in the left side of the chest between the ribs. The heart is exposed, and the PDA is tied off to stop all abnormal blood flow. Surgery patients require pain medication after surgery, and may need an extra day of hospital care.

Both procedures typically take an average of two hours to perform. Dogs that present clinical signs of heart failure (breathing difficulty, weakness) are at a greater risk of having complications with either procedure.

What happens if the PDA is not fixed?

If not corrected, dogs with PDA have a 60% mortality in the first year. Occasionally, adult dogs are diagnosed with a PDA that is small and only caused minimal changes to the heart.

Are there any complications with either procedure?

Both procedures are typically safe (98% survival), but complications can arise. Complications include rupture and excessive bleeding of the PDA or artery in the leg, incomplete closure of the PDA, device embolization to the lungs, puncture of the heart or vessels and residual air in the thoracic cavity necessitating placement of chest tubes.

Does a dog's size make a difference as to which procedure can be performed?

A dog's size must be taken into consideration when determining which procedure to perform. Dogs must weigh at least 4–5 pounds in order to perform an interventional catheterization procedure. Occasionally, a small dog can wait until it is large enough to undergo an interventional catheterization procedure. This is only considered if the PDA is thought to be small, and there is no clinical evidence of important heart changes.