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Patent Ductus Arteriosus & Persistent Right Aortic Arch

Patent ductus arteriosus (PDA), the related but less serious condition, ductus diverticulum, and Persistent Right Aortic Arch (PRAA) are congenital hereditary heart defects arising from errors of prenatal development. PDA and ductus diverticulum are caused by the failure of a shunt which bypasses the fetal lungs to go away prior to birth. The aorta, the major blood vessel leaving the heart, normally arches to the left. Fetal vessels arch to both right and left, with the one on the right going away as the left develops; when the left goes away instead that leads to PRAA.

Before birth a puppy gets oxygen via its umbilical cord but after birth it must breathe through its lungs in order to oxygenate the blood. If the ductus diverticulum the shunt remains, but is sealed and no longer transports blood.

PDA can easily be detected in young puppies because it causes a heart murmur. Every Australian Shepherd puppy should be checked for a murmur at a young age (preferably before they leave the breeder's care.) Not every murmur is a sign of PDA and some are benign and will go away. Follow your veterinarian's advice on follow-up when a murmur is found. In severe cases surgery may help but it is not without risk.

PRAA does not affect blood flow from the heart to the body but the position of the vessel can constrict the esophagus to some degree. In the worst cases it will cause megaesophagus.

Both PDA and PRAA are inherited. Both have been reported in the same Aussie families, which may indicate some common genetic factor. For this reason ASHGI classes them together for the purposes of pedigree analysis.

The mode of inheritance for PDA is unknown but probably polygenic (many genes involved.) If a dog is diagnosed with PDA, the cross which produced it should not be repeated. Neither parent, nor any other puppies they have produced should be bred to one-another or to other close relatives. If either parent produces another case of PDA, especially with a mate unrelated to itself or the one with which it previously produced PDA, it should not be bred again. Due to the potentially fatal nature of this defect, if a mating produces multiple affected offspring, the parents and unaffected littermates should be eliminated from breeding.