



PURINA Pro Club

Poodle Update

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Researchers Begin to Study Patent Ductus Arteriosus in Poodles

"Rufus" is a happy, active black Standard Poodle who enjoys frolicking with his owner. Watching Rufus today it's hard to believe he was once critically ill. Born with a congenital heart disease, known as patent ductus arteriosus (PDA), his condition went undiagnosed until he was 12 months old.

"Rufus was one of a litter of puppies born to my parents' Standard Poodle, 'Sophie,'" says Laura Fox-Clipsham, a graduate student at the Animal Health Trust in Kentford, United Kingdom. "He seemed to be in perfect health until the day he collapsed while running in our garden."

While Rufus howled in pain, Fox-Clipsham and her parents bundled him in blankets and rushed him to the local veterinary hospital, fearing the worst. Veterinarians immediately began conducting a series of tests. They suspected that Rufus suffered from a heart problem.

"They couldn't confirm his diagnosis, so they kept him under close observation until he could be seen the next day by a veterinarian who specializes in cardiac conditions," Fox-Clipsham says.

After a number of tests and scans, it was confirmed that Rufus had a hole in the heart between the left pulmonary artery and the aorta that had begun to progress toward congestive heart failure. Patent ductus arteriosus is one of the most common

canine congenital heart defects. It occurs in all three varieties of Poodle, Keeshonden, Cocker Spaniels, King Charles Cavalier Spaniels, Portuguese Water Dogs, and Border Collies.

Understanding PDA

PDA is a congenital defect in which the ductus arteriosus, a blood vessel that communicates between the aorta and pulmonary artery in the womb, fails to close after birth. The purpose of the ductus arteriosus is to allow blood to bypass the non-functional lungs before birth. Instead, the heart pumps blood directly to the aorta after the blood is oxygenated and cleansed by the dam's circulatory system. The aorta then directs blood out into the body.

After birth, the ductus arteriosus should close as pressure changes in the chest when a puppy takes his first breath. When the ductus arteriosus closes, blood is pumped from the heart to the pulmonary artery, and then into the lungs to be oxygenated and pumped back through the heart to the aorta and sent to the body for energy. If the ductus arteriosus is still open after birth, some of the blood is shunted back into the bloodstream without being oxygenated by the lungs.

As time goes on, the heart and blood vessels can become dilated due to increased blood pressure and eventually result in congestive heart failure.

Clinical signs of congestive heart failure include exercise intolerance, coughing, respiratory distress, lethargy, weakness and eventual collapse.

PDA can be detected before it progresses to congestive heart failure, if the veterinarian detects a heart murmur or swishing sound that results from the turbulence in the blood flow caused by the shunting of the blood in the abnormal vessels. Once the murmur is detected, an echocardiogram, or ultrasound of the heart, will determine if the source of the turbulence is from patent ductus arteriosus or other heart defect. The majority of PDA-affected dogs, about 70 percent, are females.

In Rufus' case, veterinarians recommended immediate surgery to close the hole in the heart. For the next few months following surgery, he experienced a slow recovery. Medications to decrease high blood pressure and help the heart function more efficiently and a limited exercise regimen helped him to eventually bounce back. Follow-up scans allowed the veterinarian to check to be sure the hole had been fully closed.

"It was hard to keep such a young, fun-loving dog from running around, but thankfully after several months, Rufus regained energy," Fox-Clipsham says. "He's now 3 years old, has made a full recovery, and is expected to live a full life."

Despite her work as a graduate scientist at the Centre of Preventative Medicine at the Animal Health Trust, Fox-Clipsham was surprised to learn that PDA is a growing health concern among Poodles and other breeds. Her experiences with Rufus prompted her to begin researching PDA in Poodles.

In Rufus' litter of eight puppies, only Rufus and his sister, "Lottie," were diagnosed with PDA. "I'm working with my colleague, Cathryn Mellersh, head of canine genetics at the Animal Health Trust, to study the genetics behind PDA," Fox-Clipsham says. "We are looking at how prevalent the condition is and have begun collecting

Recognizing Signs of Congestive Heart Failure

Patent ductus arteriosus (PDA) is a congenital heart defect affecting all three varieties of Poodle. The defect eventually progresses to congestive heart failure, but can be caught early if a veterinarian detects a heart murmur. Clinical signs of congestive heart failure include the following. Owners who notice these signs, should take their dog to the veterinarian immediately.

- Exercise intolerance;
- Coughing;
- Respiratory distress;
- Lethargy;
- Weakness; and
- Eventual collapse.

Patent Ductus Arteriosus

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DNA samples from breeders and owners of Poodles."

Testing Poodles for PDA

Christine Scruggs, V.M.D., a Waterford, Conn., veterinarian who breeds Standard Poodles, agrees that PDA has become an emerging health problem in Poodles. In a litter of puppies born in 2001 to Scruggs' sire and dam, one female puppy was diagnosed with PDA.

"The puppy didn't have a detectable heart murmur when she left our house but three weeks later was diagnosed with a murmur during a routine veterinary visit," Scruggs says. "It's likely that PDA is carried through a recessive gene, either single or polygenic in nature, which explains why only certain puppies in a litter are affected and why it can skip generations before appearing in a bloodline."

Scruggs has bred Standard Poodles for the past 16 years and has only had the one case of a puppy born with PDA. Still, she has seen a number of cases in her veterinary practice and believes breeders should have echocardiograms performed on sires and dams prior to breeding. "If an abnormality exists in one parent, there is a greater chance of it being passed on to the puppies," she says.

Some breeders have started providing dog owners with a one-year congenital health guarantee. This ensures that the breeder stands behind his breeding and helps to guard against the possibility of puppies developing PDA or other genetic conditions.

As Fox-Clipsham and Scruggs both discovered with their Poodles, most puppies with PDA show no early clinical signs. Generally the first signs are a continuous heart murmur or bounding pulse that is detected when a veterinarian examines a puppy between 6 to 12 weeks of age during the first round of vaccinations. Other puppies, such as Rufus, may go undetected until developing acute heart failure or experiencing difficulty breathing during exercise.

"The diagnosis of PDA is normally determined by the characteristic murmur," says William Herndon, D.V.M., DACVIM, a veterinary cardiologist at California Vet Specialists in San Marcos, Calif. "An echocardiogram is recommended to both confirm the diagnosis and to test for concurrent cardiac birth defects. Surgical ligation, or a vascular implant placed through the groin, is required to correct PDA and should be done as soon as possible to minimize secondary damage to the heart and lungs."

Fortunately, of all the congenital cardiac malformations in dogs, PDA is the one that is most easily treated. One option is a thoracotomy, or open chest surgery, to identify the abnormal vessel. Once the abnormal vessel

Poodle Owners Can Contribute to PDA Research

Better health screening methods plus more knowledge about canine heart conditions have helped to increase understanding about patent ductus arteriosus (PDA), a congenital heart condition that affects all varieties of Poodle.

Researchers at the Animal Health Trust in Kentford, United Kingdom, aim to learn more about the prevalence of PDA in the breed and the mode of inheritance. To advance the research, owners and breeders of Poodles are encouraged to submit DNA samples in the form of buccal cheek swabs from affected dogs and their relatives. For information, please contact:

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is identified, the surgeon can tie a ligature around the vessel and permanently close it. After the vessel is ligated, the murmur is eliminated and the physiological abnormalities associated with the shunt are cured. A temporary chest tube is used to evacuate air from the thorax and re-establish negative pressure for the dog's lungs to expand normally.

Another option is a "coil procedure." This involves feeding a coil through a large vessel that is catheterized with a guide mechanism. Most typically the coil is guided through the jugular vein down into the heart and into the patent ductus arteriosus. Once the coil is in place, it can be manipulated to close the abnormal vessel. Occasionally, more than one coil needs to be placed. This option is not available to every patient, as the success rate depends on factors such as the size of the abnormal vessel, the condition of the heart, and the health and size of the patient. If the procedure is successful, it is the least invasive technique for correcting the defect.

After surgery dogs are treated for pain. If a thoracotomy is performed, the chest tube is usually removed within 24 hours. After completing surgery at a young age, dogs generally experience a greater than 90 percent success rate and go on to lead a long, full life. If PDA is left untreated, puppies typically don't live beyond the first two years.

Practicing Selective Breeding

"Dogs with a congenital heart problem such as PDA should not be used for breeding," Herndon advises. "Both parents and siblings should be screened for PDA and other diseases before producing puppies."

To help breeders improve the health of their breed and diminish the incidence of genetic disease, Herndon notes that many board-certified veterinary cardiologists offer discounted diagnostic services to breeders so they can rule out potential genetic health problems such as PDA.

Researchers at the University of

Pennsylvania School of Veterinary Medicine studied PDA in Poodles and first published a report in 1971. Recently, a report on non-Poodle dogs was published. "Morphologic abnormalities were observed in seven of eight dogs with PDA and essentially were the same as those in dogs known to have a hereditary form of PDA," Herndon says. "These findings suggest that sporadic PDA is caused by a genetic defect in the structure of the ductus arteriosus that is similar or identical to that in the Poodle."

The University of Pennsylvania researchers encourage breeders and owners of dogs with PDA to screen relatives, particularly parents, offspring and siblings, for evidence of PDA. These dogs should not be used for breeding since PDA could potentially be passed on to offspring, they say.

"It's a good rule of thumb to breed only dogs that have been cleared of all congenital heart disease," Herndon says.

Meanwhile, research continues at the Animal Health Trust to learn more about PDA in Poodles and other breeds of dog. Once more information is available about the genetic mutation that causes PDA, breeders can make more knowledgeable breeding decisions that potentially will help to reduce the incidence of PDA in the breed. ■

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