related terms: Type A aortic stenosis, Type B aortic stenosis, subvalvular aortic stenosis

What is aortic stenosis?

In aortic stenosis, there is a partial obstruction to the flow of blood as it leaves the left side of the heart (the left ventricle) through the main blood vessel (the aorta) that carries blood to the rest of the body. The obstruction ranges from small nodules to a fibrous band, most commonly just below the aortic valve ("subvalvular aortic stenosis"). Due to the obstruction, the heart must work harder to pump out an adequate blood volume. Clinical signs and long-term outcome depend on the degree of narrowing, or stenosis.

How is aortic stenosis inherited?

In Newfoundlands, this defect has been shown to have an autosomal dominant mode of inheritance, with variable expression.

In the mildest form, the condition is undetectable and will not cause any problems for the dog. However the defect may still be passed on to offspring. The challenge for breeders and veterinarians is to identify affected dogs with very mild or no clinical signs of the disorder.

What breeds are affected by aortic stenosis?

Congenital aortic stenosis is probably the most common heart defect seen in large breed dogs. Newfoundland dogs have the highest risk for this disorder. It is also important in the golden retriever, Rottweiler, and boxer.

There is a mildly increased risk of aortic stenosis in the German shepherd, German short-haired pointer, Great Dane,samoyed and bulldog.

For many breeds and many disorders, the studies to determine the mode of inheritance or the frequency in the breed have not been carried out, or are inconclusive. We have listed breeds for which there is a general consensus among those investigating in this field and among veterinary practitioners, that the condition is significant in this breed.

What does aortic stenosis mean to your dog and you?

Dogs with mild stenosis will generally show no clinical effects and have a normal life expectancy. With moderate to severe stenosis, signs will be variable. Because of the narrowing in the aorta as the blood leaves the left ventricle, your dog's heart must work harder to pump an adequate volume of blood to the rest of the body. Depending on the degree of obstruction, your dog's heart may be able to compensate at rest but not keep up with the body's demands during exercise.

Thus you may see reduced exercise tolerance - your dog just seems to run out of steam - or fainting due to inadequate blood supply to the brain.

In response to the obstruction to blood flow, the heart muscle becomes thicker over time (left ventricular hypertrophy). As the condition progresses, your dog's heart becomes less able to compensate and you and your veterinarian may see signs associated with left-sided heart failure such as tiring on exercise, difficulty in breathing, coughing, and/or poor growth. Changes in the heart muscle can also lead to abnormal heart rhythms (cardiac arrythmias) and sudden death.

Your veterinarian can do various tests (see below) to determine the severity of the defect. Based on the results, he or she will discuss with you the long-term prognosis, and ways to manage this condition in your dog.

How is aortic stenosis diagnosed?

In young animals (less than 6 months of age) there may be no clinical signs. Thus the first indication that your dog may have a problem may come when your veterinarian hears a heart murmur during physical examination. Some low-grade murmurs are "innocent" and disappear by 6 months of age, but if the murmur is significant, your veterinarian will suggest a diagnostic workup to determine the cause. He or she will listen very carefully to your dog's heart to determine the point of maximal intensity of the murmur and when the murmur occurs during the cardiac cycle. Other diagnostic aids include chest x-rays, an electrocardiogram (ECG) and/or ultrasonography if available. To determine the extent of the narrowing, the pressure gradient across the aortic valve (between the left ventricle and the aorta) can be measured using special procedures for which your veterinarian can refer your dog to a specialist.

In an older animal or when the obstruction is pronounced there may be clinical signs associated with left-sided heart failure.

Based on the results of these various tests, your veterinarian will discuss with you the prognosis and long term management of your pet. S/he will also be able to tell you if any (and how much) change has occurred in the heart already as a result of the stenosis.

FOR VETERINARIAN:

1. MURMUR: systolic, left hemithorax, radiates into thoracic inlet and up the neck, PMI left heart base (3rd to 4th intercostal space), may be equally loud at right heart base.
2. ECG: may be normal, over time shows left ventricular enlargement, left axis shift, may show ST depression, may show ventricular arrhythmias
3. RADIOGRAPHS: may see left ventricular enlargement, cranial aortic enlargement, left axis shift. Pulmonary vasculature is normal.

4. ECHOCARDIOGRAPHY: left ventricular hypertrophy, subvalvular fibrous ring, post-stenotic dilation of aorta
5. The arterial pulse may be of reduced intensity and slow to rise.

Echocardiography (with Doppler) or cardiac catheterization is usually required to determine the severity of the defect.

How is aortic stenosis treated?

In dogs with mild aortic stenosis,there is no special treatment required. The dog should not be used for breeding and littermates should be carefully screened. Your veterinarian may suggest antibiotics in certain circumstances as a precaution against infection of the abnormal valve tissue.

With moderate to severe stenosis, the dog's exercise should be restricted. Beta-blocking drugs may be prescribed by your veterinarian to try to minimize the effects of left ventricular hypertrophy. Your veterinarian will recommend other therapy if required to manage congestive heart failure. Medical management for congestive heart failure is similar no matter what the cause, and consists of medications to support the heart muscle and decrease the work load of the heart, together with dietary recommendations.

Various surgeries have been attempted to alleviate the obstruction with limited success. The surgery itself carries a high risk, and there is little, if any, increase in survival rates compared with dogs whose condition is managed medically.

Breeding advice

Affected individuals should not be used for breeding, and littermates should be carefully screened.

FOR MORE INFORMATION ABOUT THIS DISORDER, PLEASE SEE YOUR VETERINARIAN.

Resources

Bussardori, C. 1998. Breed related echocardiographic prognostic indicators in pulmonic and subaortic stenosis. ACVIM-Proceedings of the 16th Annual Veterinary Medical Forum: 140-142.

Bonagura, J.D. and Darke, P.G.G. 1995. Congenital heart disease. *In* S.J. Ettinger and E.C. Feldman (eds.)Textbook of Veterinary Internal Medicine, p. 892-943. W.B. Saunders, Toronto.

Patterson, D.F. 1996. The genetics of canine congenital heart disease. ACVIM-Proceedings of the 14th Annual Veterinary Medical Forum: 225-226. **This**

reference has good information for breeders and veterinarians regarding screening and genetic counselling for congenital heart defects.

Revised: .

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