



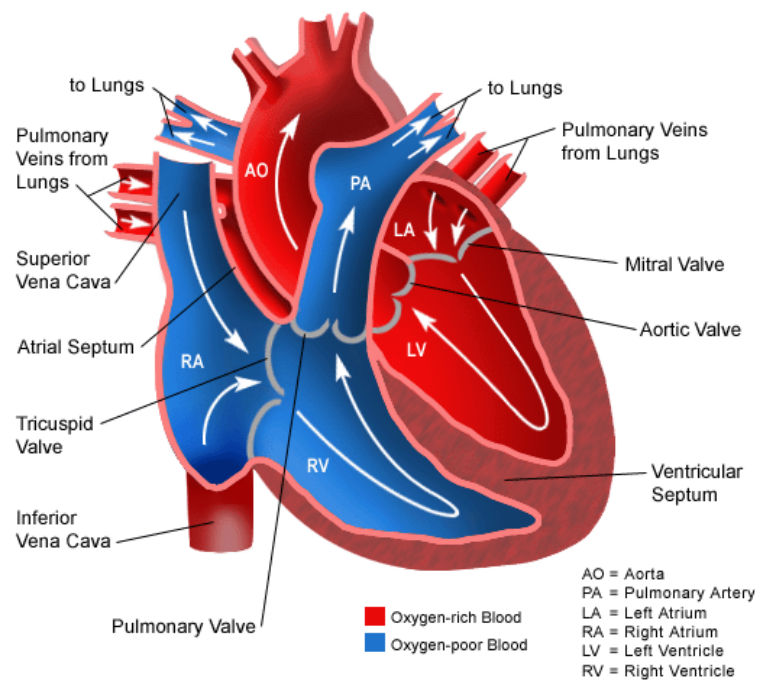
Aortic Stenosis

BRIEFLY, HOW DOES THE HEART WORK?

The heart has four chambers. The upper chambers are called atria. One chamber is called an atrium, and the lower chambers are called ventricles. In addition to the upper and lower chambers, the heart is also considered to have a right and left side.

Blood flows from the body into the right atrium. It is stored there briefly, then pumped into the right ventricle. The right ventricle pumps blood into the lungs, where it receives oxygen. It flows from the lungs into the left atrium; it is held here briefly before going into the left ventricle. The left ventricle contains the largest muscle of the heart so the blood can be pumped out to all parts of the body.

Movement of blood results from electrical impulses that are transmitted from the brain to the heart. The impulses not only direct the heart to beat but also to maintain a steady, regular rhythm.





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WHAT IS AORTIC STENOSIS?

Blood is pumped from the left ventricle to a particularly large blood vessel called the 'aorta'. (The aorta is the body's largest artery.) The valve that separates the left ventricle from the aorta is called the 'aortic valve'. The left ventricle narrows as it leads to the aorta and this area is called the 'aortic outflow tract'.

Aortic stenosis (AS) is a "narrowing" just above or below the aortic valve, or (rarely) of the actual valve, causing a partial obstruction of the blood flow from the left ventricle of the heart, through the aortic valve, and into the aorta.

The stenosis (narrowing) is caused by the abnormal formation of nodules, or a fibrous ridge, or ring of tissue. The heart therefore has to work harder to pump an adequate supply of oxygenated blood from the left ventricle through the narrowed area. The blood squirts through in a turbulent fashion (like if you squeezed down on a garden hose) and creates the sound known as a heart murmur.

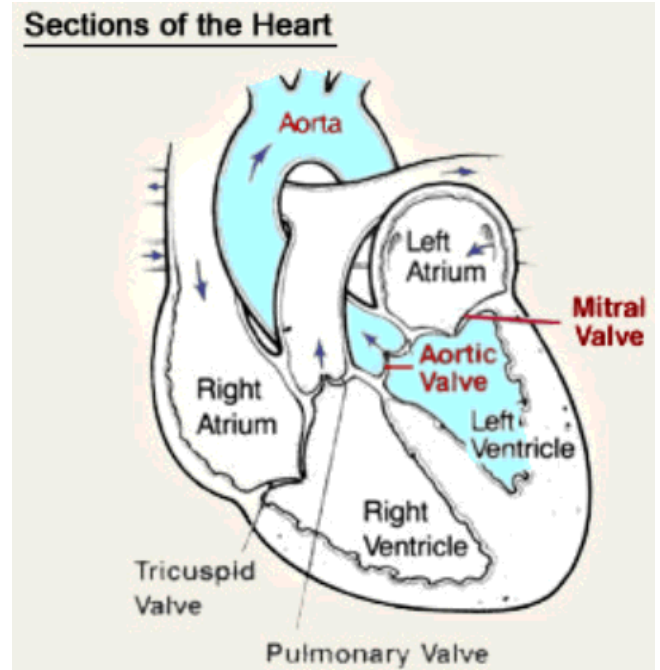
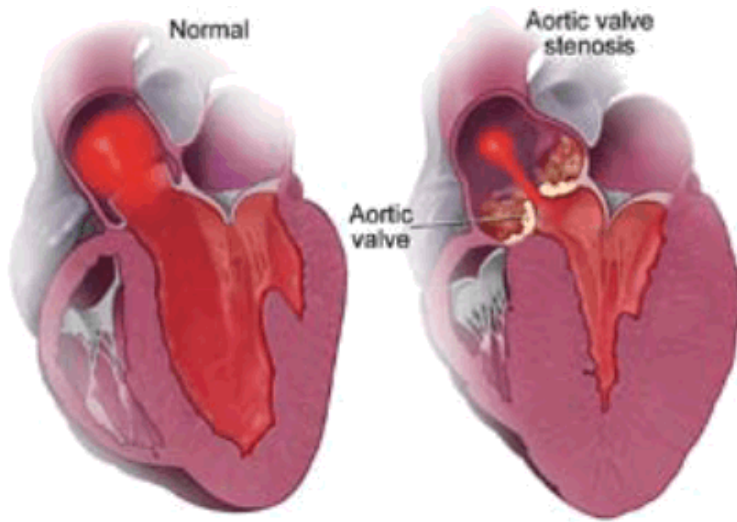
HOW COMMON IS AORTIC STENOSIS?

- Subvalvular aortic stenosis (SAS) is the most common form of aortic stenosis and is the most common congenital heart disease of large breed dogs. The defect is located just **below** the aortic valve. The most commonly affected breeds for SAS include the Golden Retriever, Rottweiler, Newfoundland, Great Dane, Boxer, German Shepherd and German Short-haired Pointer.
- Supravalvular aortic stenosis is not so frequently seen and is located just **above** the aortic valve.
- Valvular aortic stenosis is rare and is located **within** the aortic valve.





WHAT ARE THE CONSEQUENCES OF AORTIC STENOSIS?



Normal left ventricle compared to one where the patient has aortic stenosis. Much less blood can pass the aortic valve and the extra work of the ventricle manifests as thickened muscle.

When a puppy with aortic stenosis is born, the stenosis is minimal; barely a ridge near the valve, but over the first four to six months of life the stenosis grows and becomes more apparent. Over time, the muscle of the left ventricle thickens and grows due to the excess work it must perform. Eventually this interferes with the pumping chamber's flexibility and ability to fill, and can also cause a leak in the mitral valve resulting in a backing up of fluid in the lungs. Abnormal muscle in the heart makes for abnormal electrical conductivity in the heart and soon the heart's normal electrical rhythm may be disrupted. These issues can lead to fainting spells and even sudden death.





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WHAT ARE THE SIGNS OF AORTIC STENOSIS?

The earliest sign of aortic stenosis is a heart murmur. This is produced by turbulent blood flow and, in this instance, is usually quite loud due to the obstruction of the aortic valve.

***Note: Puppies under 16 weeks of age sometimes demonstrate what is called a 'physiological' or 'innocent' murmur. These are not very loud and disappear as the puppy gets older; any murmur that persists or is felt to be loud should be pursued.*

When the heart is not properly pumping blood to the body, the animal may become lethargic or have a lack of stamina when exercising. If there is a backing up of fluid in the lungs (this can occur in severe cases of aortic stenosis) the animal will also find it more difficult to breathe, and may start coughing/gagging.

Signs to look out for may include;

- Change in heart sound (heart murmur)
- Lethargy/weakness or fainting spells
- Increased sleeping breathing rate if heart failure occurs (<30 breaths/min is normal – see sleeping breathing rate chart)

HOW IS AORTIC STENOSIS DIAGNOSED?

The best way to diagnose aortic stenosis is to perform an echocardiogram (heart ultrasound). This gives the most accurate determination of the size of each heart chamber, the thickness of heart walls, a visual on valves and a look at the direction and velocity of blood flow through the chambers.

Occasionally a chest xray and ECG (electrocardiogram) may be recommended. These give us the best look at the heart size and an assessment of the electrical activity of the heart.





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The combination of all of these tests gives us our best evaluation of the animal's heart function, however if cost considerations prohibit us performing all of them, two or three will provide much valuable information.

IS THERE TREATMENT FOR AORTIC STENOSIS?

The goal of treating aortic stenosis is to create normal ability to exercise and normal life span. Sometimes we will treat the patient medically, most commonly with Beta Blockers. It is hoped that beta blockers will slow down the heart enough to avoid an abnormal electrical rhythm (which can result in fainting/collapse episodes) and reduce the stress load of the heart. Of all the treatment options, medical management is certainly the least invasive and least expensive.

Open heart surgery or balloon valvuloplasty (inserting a balloon catheter and inflating the stenosed area) can be performed in dogs, but ultimately the survival times for these patients tend to be similar to those of dogs simply taking medication.

***Note: It is helpful to keep a record of your pet's resting respiratory rate so that your veterinarian can identify any changes in your pet's normal breathing pattern.*

HOW MUCH LONGER WILL MY PET LIVE?

There are many factors that must be considered before this question can be answered and there are a couple of supportive measures that can be taken to potentially increase the animal's lifespan.

Beta blockers may lessen the effects of the stenosis and possibly prolong life, although studies have shown that only 25% of animals with severe aortic stenosis will live past the age of 3-4 years.

Exercise should be moderated in severe cases as there is a strong correlation between sudden death episodes and aortic stenosis patients undergoing strenuous activity or excitement.

