

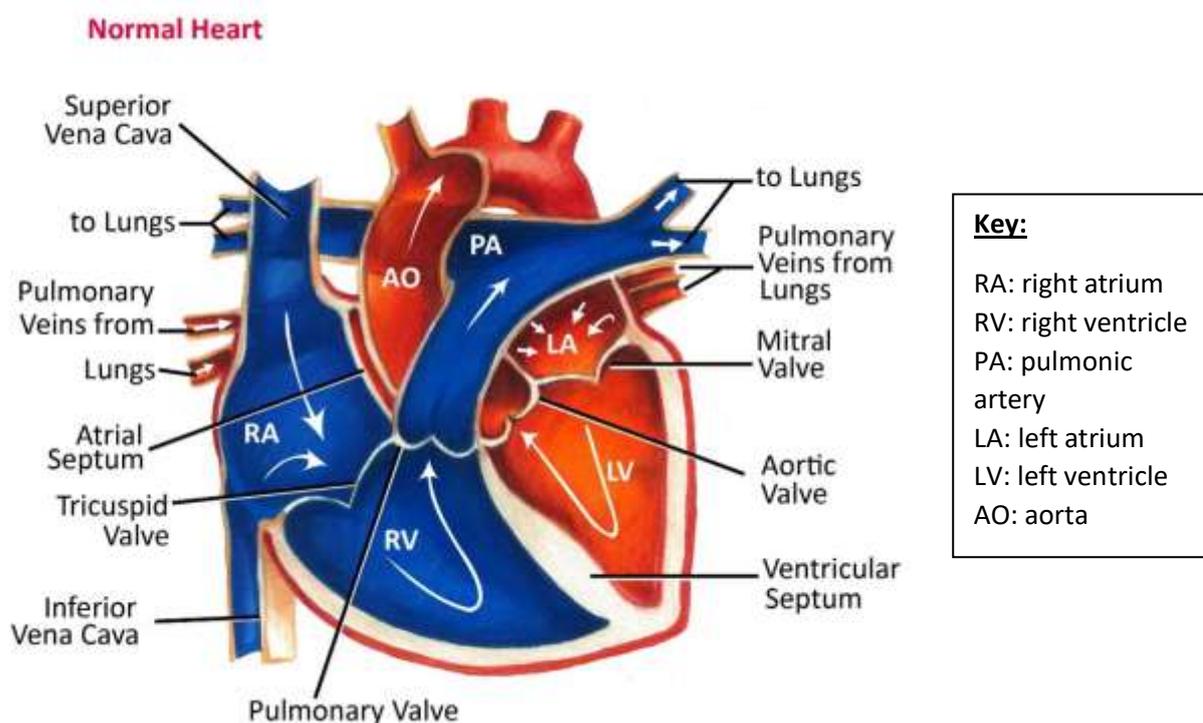


Subvalvular Aortic Stenosis

How does the heart work?

The heart is the organ responsible for pumping blood to and from all tissues of the body. The heart is divided into right and left sides. The job of the right side is to pump oxygen-deficient blood returning from the body into the lungs where fresh oxygen is collected and carbon dioxide is removed. The oxygen-rich blood returning from the lungs enters the left side of the heart where it is pumped into the aorta then to the rest of the body via the arterial system.

Each side of the heart has two chambers, an upper atrium and a lower ventricle. Between the atrium and ventricle on each side lies a valve – the tricuspid on the right and the mitral on the left – that regulates blood flow into the chambers. As the heart pumps, these valves act as one-way gates allowing blood to flow from the atrium above to the ventricle below and preventing blood from flowing back into the atrium. From the ventricles, blood is then forced to flow out into the pulmonary artery (on the right) or the aorta (on the left) through a second series of one-way valves called the pulmonic valve and the aortic valve, respectively. The region immediately before the pulmonic and aortic valves is called the ventricular outflow tract (this is the narrowest part of both ventricles).



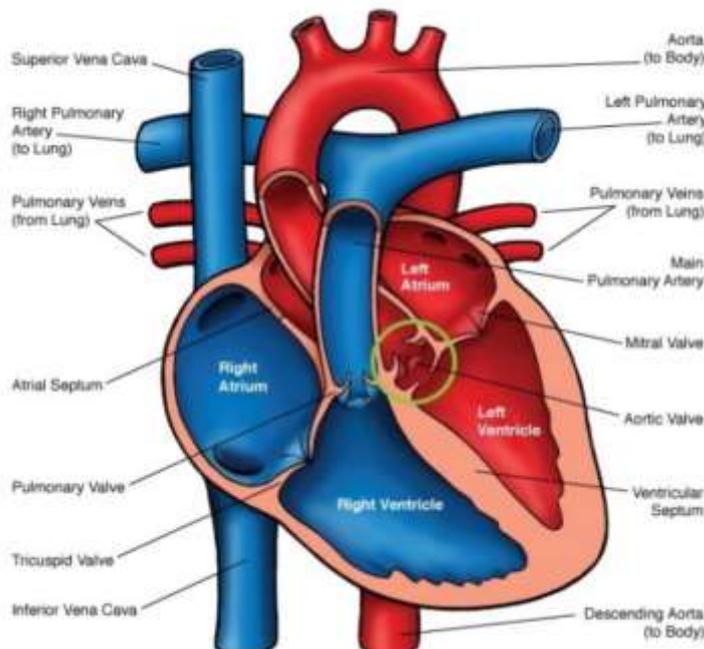


What is Subvalvular Aortic Stenosis?

In subvalvular aortic stenosis (SAS), the left ventricular outflow tract just below the aortic valve has a scar-like narrowing or stenosis (the medical term for narrowing). This means that the left ventricle must work harder to pump the correct blood volume through the narrowed area. The blood squirts through in a turbulent fashion, which creates a sound known as a heart murmur (which your veterinarian hears when listening to your pet's heart with a stethoscope). When first born the stenosis is often mild. However, over the first 12 months of life it may progressively worsen.

The consequences of this condition depend on the severity of the stenosis. Speaking about severe cases, the muscle of the left ventricle slowly thickens and grows due to the excess work it must perform. This thickening is initially compensatory however later it becomes detrimental to cardiac function. The main detrimental effect of this thickening is inadequate oxygen supply to the heart muscle (blood vessels generally do not grow in proportion with the heart muscle). The result are abnormal heart rhythms (called ventricular arrhythmias) that can cause fainting and even sudden cardiac death (oxygen supply to the heart is further compromised with exercise/exertion hence the reason exercise sometimes exacerbates these arrhythmias). The other main concern is the development of congestive heart failure (meaning fluid building up in the lungs), which causes breathing difficulties. This is a less common complication of SAS. Bacterial infection of the aortic valve is a possible but rare complication of SAS.

The most commonly affected breeds with SAS include the Golden Retriever, Rottweiler, Newfoundland, Great Dane, Boxer, German Shepherd, German Short-Haired Pointer and Dogue de Bordeaux. A genetic element is highly likely in these breeds.



Subvalvular Aortic Stenosis

The green circle represents the narrowing/stenosis immediately below the aortic valve



How is SAS diagnosed?

Although a diagnosis of SAS may be suspected based on the breed and type of murmur, a definitive diagnosis requires echocardiography (cardiac ultrasound). In addition to achieving a definitive diagnosis, echocardiography allows the veterinarian to assess the severity of stenosis as well the presence of any other concurrent defects.

How is SAS treated?

Mild (and many moderate cases) of SAS generally do not require treatment.

Unfortunately, there is no current treatment (medical or surgical) known to significantly improve the outcome of dogs with severe SAS.

Medical therapies are sometimes used in dogs with severe SAS. These include:

- Beta blockers (these are medications designed to decrease heart rate and contractility): There are multiple theoretical benefits to administering beta blockers in SAS patients (e.g. promoting relaxation of the ventricles and improved filling of the heart) however it is unknown whether these medications enhance quality of life or extend survival.
- Anti-arrhythmic drugs: These are generally reserved for dogs with severe ventricular arrhythmias.
- Diuretics: These are reserved for those patients that develop congestive heart failure. These force the kidneys to expel large volumes of water from the body (through the urine) which in turn eliminates the fluid in the lungs.

What about exercise?

Although exercise in theory may precipitate fainting or even increase the risk of sudden cardiac death, exercise is not necessarily discouraged (unless there is a specific reason such as severe ventricular arrhythmias or frequent fainting). Most importantly, dogs with SAS should not be forced to do any exercise they don't want to do. Also, exercise in hot weather is best avoided.

What is the prognosis?

Dogs with mild SAS generally have a normal life expectancy.

Dogs with moderate SAS may or may not develop clinical problems in their lifetime (therefore prognosis in these dogs is difficult to predict).



VETERINARY CARDIAC SERVICES

A U S T R A L I A | N E W Z E A L A N D

Dogs with severe SAS are considered to have a poor long-term prognosis. In saying this these dogs may still live 4-5 years on average with a good quality of life.

The final severity of SAS (and hence prognosis) can only be determined at 12 months of age or older, because as stated earlier, it is well known the severity of stenosis can continue to worsen up until this point.

Subvalvular aortic stenosis is a genetic disease.

Because inheritance is not simple, dogs with mild disease may produce puppies with severe disease.

No dog with subvalvular aortic stenosis of any degree should be bred.

Additional Resource:

<http://vetmed.tufts.edu/heartsmart/>

This is a very useful and well-written resource, providing pet owners with a clear and credible source of information about veterinary cardiology.