



# Sub-Aortic Stenosis (SAS)

## What is SAS?

Subvalvular aortic stenosis (SAS) is one of the most common congenital heart defect in large breed dog, with a particular predisposition in Golden retrievers, Newfoundlands, Boxers and English bulldogs.

In the diagram in the upper right hand corner of this handout, the right side of the heart is indicated in blue (non-oxygenated blood). This blood flows through the pulmonary artery to the lungs, becomes oxygenated and flows into the left side of the heart (indicated in red). Here it passes from the left atrium (upper chamber) to the left ventricle (lower chamber) and then through the aortic valve, into the aorta to supply blood to the rest of the body. In a case of SAS the blood that is supposed to go through the aortic valve is partially blocked by an obstruction.



## How can we treat this condition?

Unfortunately, at present, this condition is not treatable. Several surgical procedures have been tried to remove the fibrous tissue below the aortic valve with disappointing results. Balloon catheter dilation has also been attempted but results reported in the literature are not particularly encouraging. The use of beta-blockers (eg Atenolol) has been advocated for years but increased life expectancy has not been proven and these drugs may cause further lethargy in dogs with SAS. Clinical signs of CHF can be

## What causes SAS?

SAS is due to dense fibrous (scar-like) tissue forming just below the aortic valve in the left ventricle. This is called a stenosis. This can be in the form of ring-like structures either partially or entirely surrounding the outflow tract. Thinking of a garden hose, as we place our thumb over the stream of water it rushes out at a higher speed and is more turbulent. This is similar to the way the fibrous tissue acts at the level just below the aortic valve. The fibrous tissue is usually present at birth but over time the stenosis can worsen, causing blood to pass through the outflow tract in a more turbulent fashion.

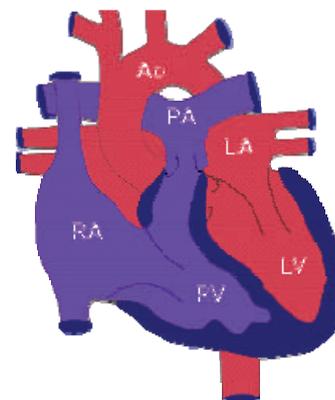
## What are the clinical signs associated with SAS?

The first sign of SAS is usually the heart murmur caused by the blood turbulence explained above. Sometimes the murmur is not audible at birth. However, as the stenosis progresses, the murmur becomes more readily heard with the aid of a stethoscope. One other sign associated with SAS is exercise intolerance and this may be found in more severe cases. Occasionally, severe cases of SAS can develop arrhythmias, responsible for

controlled by using diuretics (water pills). Arrhythmias can be treated with anti-arrhythmic drugs.

## What is the prognosis for a dog once SAS is diagnosed?

A prognosis can be offered based upon severity and depends on the systolic pressure gradient measured on echocardiography. Severe cases often develop clinical signs (exercise intolerance and malignant arrhythmias, which may cause syncope and sudden death) typically within the



fainting (syncope) or even sudden death, and congestive heart failure, which causes respiratory difficulty (dyspnoea).

## How is SAS diagnosed?

Diagnosis of SAS needs to be confirmed by heart ultrasound (echocardiography) performed by an experienced cardiologist. The severity of the defect is commonly based on Doppler measurement of the blood pressure gradient across the stenotic lesion (Mild: from 20 to 49 mmHg; Moderate: from 50 to 80 mmHg; Severe: above 80 mmHg).

first 3-4 years of life.

Moderate cases may have a variable clinical presentation and their life expectancy is difficult to anticipate, even if many cases have life of normal length and quality. Mild cases tend to live a full normal life. It has been reported that dogs that survive with SAS beyond 3 years, usually do not have a defect severe enough to produce a marked effect on cardiac performance.

*This handout provides a general overview on this topic and may not apply to all patients.*

*Please do not hesitate to contact us if you require any additional information. ([www.cardiospecialist.co.uk](http://www.cardiospecialist.co.uk))*