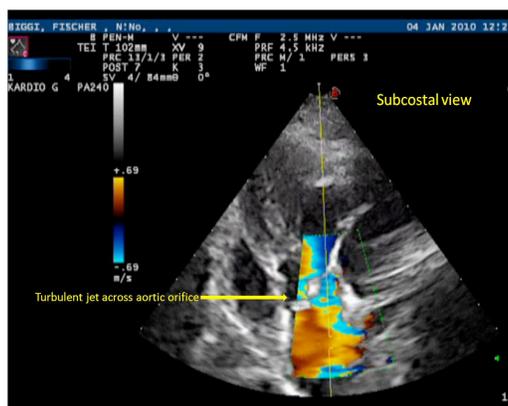


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SUBVALVULAR AORTIC STENOSIS (SAS) - 2 PAGES



Subvalvular Aortic Stenosis (**SAS**) is the second most common heart defect in the dog and is more common in large breed dogs including Newfoundlands, Golden Retrievers, Boxers and Rottweilers, and others.

Primary findings include an ejection character heart based murmur, syncope, and possibly CHF. Hypokinetic pulses may be present in more advanced cases. **Primary differentials** include PS, VSD, MR, and PDA and idiopathic flow murmur.

Radiographs can be interpreted as completely normal or can have significant changes with an aortic bulge, left atrial and ventricular enlargement and possibly pulmonary venous congestion and congestive heart failure.

Cardiac biomarker: An NT-proBNP level may be useful in young puppies with murmurs to screen for congenital anomalies. NT-proBNP levels have been demonstrated to be elevated in dogs with various congenital diseases. In a recent study by Saunders et al, the median value of NT-proBNP in dogs with SAS was reported at 833 pmol/L whereas normal dogs had a median value of 333 pmol/L (JVIM 2009 Abstract). While the elevation of NT-proBNP is not specific for SAS, an elevated level should prompt additional diagnostic tests specifically, echocardiography.

Echocardiography: Subvalvular lembus is often, but not always present demonstrating morphological defect. However, echocardiographic spectral Doppler analysis of LVOT velocity > 300 cm/sec at < 15 degree cursor angle is necessary for the diagnosis. Other hyperdynamic states can elevate LVOT velocities (normal < 200 cm/sec) but not typically to > 300 cm/sec. Many of these patients may be asymptomatic and may not demonstrate secondary morphological changes (LV hypertrophy, MR, LA enlargement, CHF)

Newfoundlands represent the severe degree tendency while many insignificant forms of SAS are found in the boxer. Inheritance has been shown and therefore breed screening is recommended but not always decisive and exclusionary on single echo analysis. In most cases, the severity of SAS is categorized as mild, moderate or severe based on the Doppler determined pressure gradient. Severe is typically diagnosed when the gradient is $>$ than 100 mmHg and moderate > 50 mmHg.

The variability in the presence and intensity of a low intensity ejection murmurs in Boxers is high during growth with no obvious progression. Both in young and adult boxers the murmur grade increased during excitement, which may be due to rapid flow in a comparatively small LVOT that has been suggested for the Boxer breed according to Dr. Høglund's presentation at ACVIM 2008.

SAS patients are predisposed to bacterial endocarditis and necessitate prolonged antibiotic therapy during surgical, dental procedures, as well as general infections (pyoderma, pyometra, UTI).

Therapy: Moderate/severe cases are at risk for sudden death. Medical therapy with a beta blockade (atenolol 0.5-1.0 mg/kg bid) is the preferred treatment as well as mild exercise restriction in severe cases. Balloon valvuloplasty is no longer typically performed in most cases due to the lack of long term effect and difficulty in properly reducing the pressure gradient (compared with pulmonic stenosis, where valvuloplasty is the treatment of choice). Both of these improve the mean survival time to 45 months in moderate/severe cases as opposed to MST of 19 months for untreated cases.

This is a summary of material derived from ACVIM 2006-2009 as well as other sources.

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