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Clinical Sonography & Telecytology
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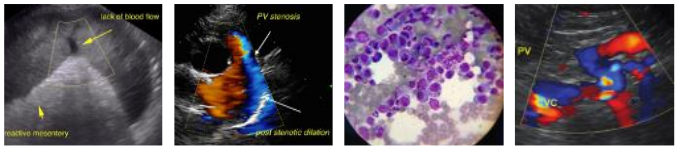

PATIENT
Pepper Minero

SPECIES
Canine

BREED
Lab Mix

SEX
Female Spayed

AGE
6 months

WEIGHT
40lbs

INTERPRETED BY
Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY
Dana Alterman, RDCS, LVT

HOSPITAL NAME
Eubank Animal Clinic

REFERRING VET
Dr. Kincade

INVOICE
25512

DATE
7/25/22

PRESENTING CLINICAL SIGNS
History: Grade 4-5/6 heart murmur.

ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.
A single lead ECG is available; 50mm/s, 20mm/mV. The average heart rate is 140bpm (range 125-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. No ectopic beats, pauses or other dysrhythmias observed. ECG diagnosis: Normal sinus rhythm with respiratory variation.

ECHOCARDIOGRAM FINDINGS
2D, m-mode, color flow and doppler imaging is available. The mitral valve leaflets appears mildly thickened with no mitral regurgitation. No obvious prolapse into the left atrial lumen. No left atrial dilation. Normal LV internal diameter with normal myocardial function. The left ventricular walls are normal. Mildly hypertrophied papillary muscles. Sub-aortic narrowing is visualized (see below). The aortic valve appears trileaflet although is difficult to visualize clearly. No obvious valvular stenosis. The aortic outflow velocity is consistent with a moderate to severe stenosis. Mild aortic insufficiency. The tricuspid valve appears mildly thickened with trace tricuspid regurgitation. Normal velocity. Normal right atrial and ventricular diameter and morphology. The pulmonic valve is normal in morphology and mobility. No pulmonic insufficiency. Normal PA outflow velocity. No pericardial or pleural effusion noted. No cardiac tumors identified.

CARDIAC CHART

CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (Boon method)	LA/AO (Heart Base; Swe)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
PATIENT	NA	2.5	NM	1.2	29	50	NM
CANINE CARDIAC PARAMETERS	**HR** (BPM)	**AV VMAX** (m/s)	**PV MAX** (m/s)	**BODY WEIGHT** (kg)	**LA** 2D short axis Base view (cm)	**LVIDd** Avg; 2D and m-mode short axis (cm)	**LVIDs** Avg; 2D and m-mode short axis (cm)
NORMAL PARAMETER	50-100	0.7-1.7	0.7-1.6	BELOW	BELOW	BELOW	BELOW
PATIENT	NM	4.4	1.0	18.1	2.0	3.4	2.4
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
BODY WEIGHT DEPENDENT PARAMETERS				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)
**Note: All measurements based upon multi-modal images and methods. An average value is reported.*				10	1.50 (3.8)	3.27 (3.5)	2.06 (3.1)
				15	1.83 (2.0)	3.71 (2.4)	2.43 (2.1)
				20	2.02 (1.9)	4.14 (2.2)	2.80 (2.0)
Adapted from June Boon, Veterinary Echocardiography, 1998				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435				30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
Hansson et al, Vet Rad and Ultrasound 2002				35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995				40	2.62 (5.2)	5.48 (6.1)	3.96 (5.4)
				50	2.88 (7.1)	6.07 (8.3)	4.46 (7.4)

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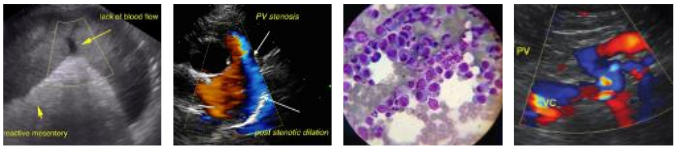

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The cause of the murmur is sub-aortic stenosis (SAS) causing elevated blood flow velocity through the LVOT and aortic valve. The velocity is indicative of a moderate to severe stenosis; however, the LV is minimally hypertrophied. This may develop over the lifespan of the patient; however, it is encouraging that minimal abnormalities are noted thus far. There is also an aortic leak which should be monitored going forward. It is important to note that small abnormalities are easily missed on congenital screenings; any congenital case should consider referral for advanced imaging and lifelong management. The ECG is unremarkable with a normal sinus rhythm.

Surgery for SAS has not been proven to alter long term outcome, however select Universities will attempt a cutting balloon valvuloplasty. Medical management through heart rate control is recommended as below, in hopes of decreasing the obstruction long term. Omega fatty acid supplementation may be of some long-term benefit.

Prognosis is guarded yet highly variable, with many dogs in the severe category succumbing to malignant arrhythmias by mid-life and others maintaining asymptomatic status for some time. Serial echocardiography is recommended lifelong to assess for progression and risk for complication as the patient matures. There is risk for progression up to 1 year of age, and may limit prognosis going forward. Monitor for development of labored breathing, exercise intolerance or collapse episodes, as SAS patients are more predisposed to development of arrhythmias than to CHF. Mild exercise restriction is advised lifelong.

Atenolol is recommended as below to help decrease heart rate and lower the pressure gradient long-term as below (target HR <130bpm).

Once Atenolol is initiated, anesthetic risk is mild. Avoid heart rate stimulating drugs such as atropine or glycopyrrolate unless clinically indicated. Avoid ketamine and acepromazine due to systemic vascular effects. Cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction, isoflurane gas) are recommended. Pre-oxygenate for 5-10 minutes prior to induction. Mild IV fluid restriction is advised. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Recommend prophylactic antibiotics for any orthopedic or dental procedure in the future given predisposition to endocarditis.

PLAN

Institute atenolol to effect: 0.5-1.5mg/kg SID-BID (up-titrate to desired effect). Goal is to suppress heart rate <130bpm even with stress/activity.

Recommend recheck echocardiogram in 6-12 months to screen for progression.

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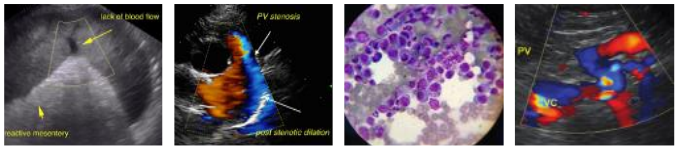

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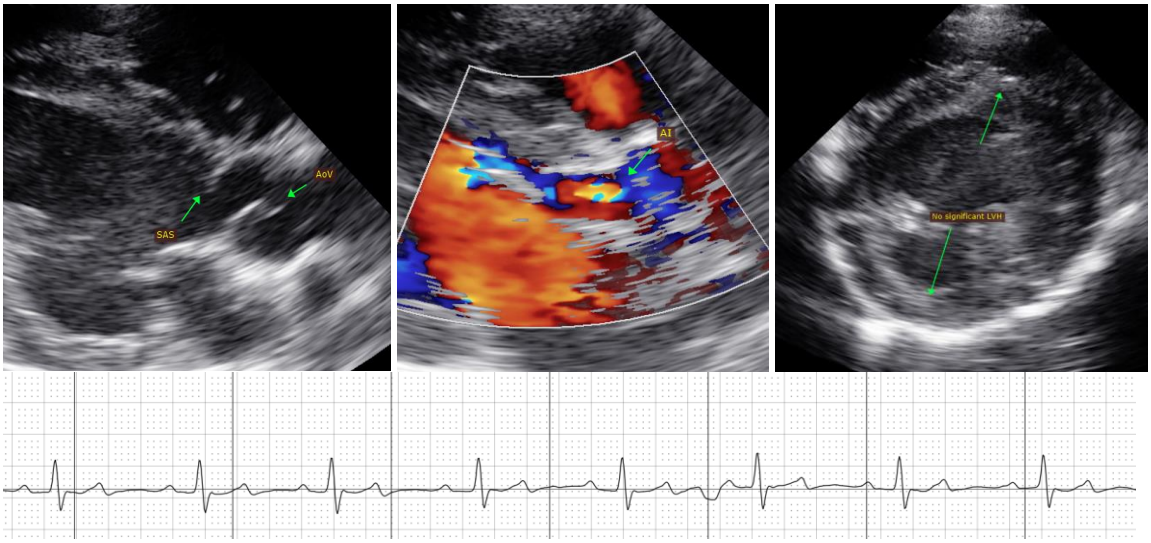
IMAGES



The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

Thank you for this referral. This report was generated using transcription software, and minor dictation errors may be present. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance, please contact me.

Maggie Machen Lamy, DVM
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info@sonopath.com