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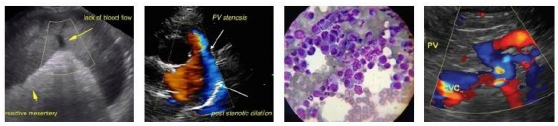

IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

PATIENT
Sugar Moffitt

SPECIES
Canine

BREED
Pomeranian

SEX
Female Spayed

AGE
8.3 years

WEIGHT
6.2lbs

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

IMAGING PERFORMED BY
Loetitia St-Jacques, LVT/RVT

HOSPITAL NAME
Options Veterinary Clinic

REFERRING VET
Dr. Hewitt

INVOICE
23466

DATE
4/5/22

PRESENTING CLINICAL SIGNS

History: Recent episode of collapse. Grade 3/6 murmur. Treatment initiated for CHF and pneumonia.
-Current Medications: Furosemide 12.5mg tablets 1/2-tab BID, Clavamox 62.5mg/mL 0.7mL PO BID, Sildenafil Citrate 20mg: 1/4 tab PO q8hr.

ELECTROCARDIOGRAPHIC FINDINGS

A six lead ECG is available at 50mm/s; 10mm/mV. The average heart rate is 210bpm with a largely regular rhythm. P for every QRS complex and vice versa. The P wave morphology is positive with a normal dimension. Normal PR. The QRS is isoelectric. MEA is deviated left. No ectopic beats, pauses or dysrhythmias observed.
ECG diagnosis: Sinus tachycardia with left axis deviation.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve leaflets with minimal prolapse into the left atrial lumen. Trace mitral regurgitation with a small left atrial dimension. Small LV diameter with adequate myocardial function. Septal flattening in systole. The tricuspid valve appears thickened with moderate tricuspid regurgitation. Velocity consistent with severe pulmonary hypertension. Moderate right atrial enlargement; moderate right ventricular dilation and hypertrophy. Pulmonic and aortic valves are normal in morphology and mobility. Mild main PA and branch dilation. Trace pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion. No cardiac tumors observed.

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		5.3	NM	1.1	38	70	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	1.3	1.1	2.8	1.2	1.3	0.8
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)
				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)
				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
				30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
				35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
				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)

BODY WEIGHT DEPENDENT PARAMETERS

**Note: All measurements based upon multi-modal images and methods. An average value is reported.*

Adapted from June Boon, Veterinary Echocardiography, 1998
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435
Hansson et al, Vet Rad and Ultrasound 2002
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995

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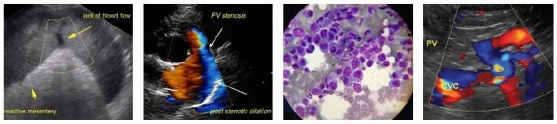

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is present, as evidenced by severe right heart/MPA enlargement. The estimated systolic pulmonary arterial pressure is >100mmHg, with normal being <25mmHg. This is causing severe hypertrophy and dilation of the right heart (indicating severe right-heart pressure overload). The left heart dimensions are normal to small, with significant volume depletion. No additional issues are identified. The ECG does show a sinus tachycardia with a left axis deviation. This is likely due to a bundle branch block and is benign in nature. No dysrhythmias are observed.

Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to severe PAH. The underlying genesis of PAH is poorly understood in cases other than heartworm infestation, though it occurs with increased frequency in a variety of forms of chronic lung disease and in patients with idiopathic pulmonary fibrosis. Given the chronicity of the disease seen here (no acute respiratory history is known), COPD/chronic bronchitis and/or primary PF as an underlying cause with an acute secondary exacerbating insult (infectious or inflammatory) is suspected. Patients with this degree of PAH and pulmonary disease can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and **exertional syncope** if poorly controlled.

Given the reported respiratory signs and syncope, the most common cause is an infectious or inflammatory insult causing a decline in already poor oxygenation status. A PTE cannot be ruled out. Coverage with broad spectrum pulmonary antibiotic (fluoroquinolone) is recommended, in addition to aggressive vasodilation using pimobendan and sildenafil. Diuretics are contraindicated prior to congestive heart failure as they can further reduce pre-load in cases of debilitating PAH and worsen clinical signs. The patient appears volume underloaded, and cautious fluid resuscitation may be beneficial depending on PE findings and renal values. Continued hospitalization for oxygen support and IV antibiotics may be necessary.

Once stable, use of theophylline and/or taper course of anti-inflammatory steroids can also be beneficial in these cases, to treat exertional dyspnea or acute flare ups and decrease the inflammatory component as much as possible. PRN use of cough suppressants may also be beneficial. Unfortunately, the prognosis overall is poor, however I am hopeful we can provide some medical relief going forward.

Omega fatty acid supplementation (anti-inflammatory) may be of some long-term benefit. Monitor for worsening of labored breathing, exercise intolerance or collapse episodes.

PLAN

Continue Clavamox as prescribed. If any residual respiratory signs, a course of Baytril can be utilized. Continue sildenafil (Viagra) 1-2mg/kg PO q8h. Institute Pimobendan 0.25-0.3mg/kg PO q12h. Discontinue Lasix, assess hydration and consider fluid therapy if needed. Can also use hydrocodone and/or theophylline depending on chronic clinical signs of cough/exertional dyspnea.

Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any development of clinical signs.

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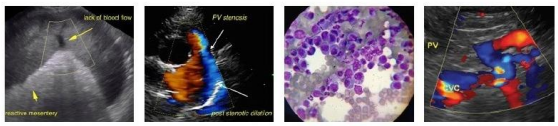

PAWS
Portable Animal Western Sonography, Inc.
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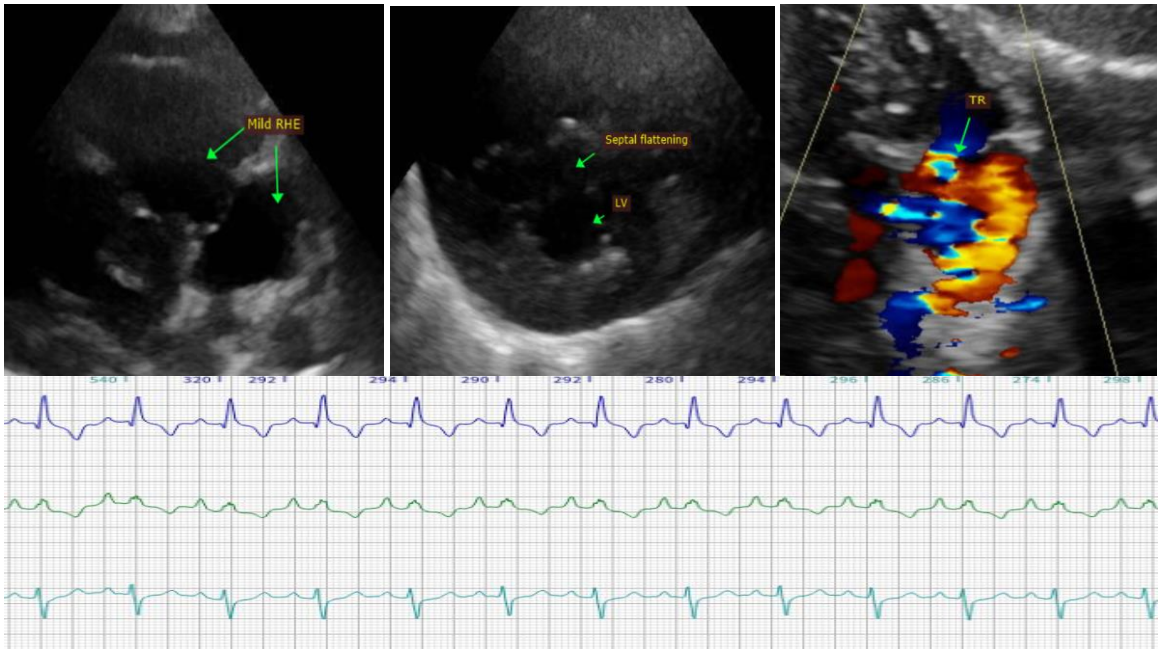

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)
info@sonopath.com