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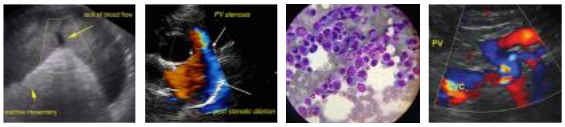


ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Daisey Starkweather

SPECIES
Canine

BREED
Chihuahua

SEX
Female Spayed

AGE
5 years

WEIGHT
6.3lbs

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

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
West Salem Animal Clinic

REFERRING VET
Dr. Siranni

INVOICE
26408

DATE
9/15/22

PRESENTING CLINICAL SIGNS

History: Labored breathing with crackles on lung auscultation. No heart murmur. BP: 123, 142, 154, 153. Sedated: Received Alfaxone.
-Current medications: Furosemide Liquid 1ml q12h.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.

Mild right-sided cardiomegaly. No obvious evidence of CHF.

ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.

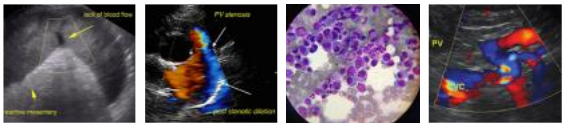
A single lead ECG is available; 50mm/s, 10mm/mV. The average heart rate is 200bpm with a regular rhythm. The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P morphology is positive. The QRS is inverted. No ectopic beats, pauses or dysrhythmias observed.
ECG diagnosis: Normal sinus tachycardia.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Normal mitral valve with no obvious prolapse into the left atrial lumen. Trivial mitral regurgitation with a small left atrial dimension. Normal MR velocity. Small LV diameter with adequate myocardial function. The tricuspid valve appears mildly thickened with mild tricuspid regurgitation. Moderate right atrial enlargement; moderate right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. TR velocity consistent with moderate to severe PAH. The pulmonic and aortic valves are normal in morphology and mobility. Mild main PA and branch dilation. Mild pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial and small volume 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	4.9	4.5	1.0	1.0	45	90	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	176	0.6	0.6	2.9	1.2	1.1	0.6
*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)
				10	1.50 (3.8)	3.27 (3.5)	2.06 (3.1)
Adapted from June Boon, Veterinary Echocardiography, 1998				15	1.83 (2.0)	3.71 (2.4)	2.43 (2.1)



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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

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)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is suspected, as evidenced by an elevated TR velocity and right heart/MPA enlargement. The estimated systolic pulmonary arterial pressure is >80mmHg, with normal being <25mmHg. This is causing hypertrophy and dilation of the right heart and MPA (indicating right-heart pressure overload). The left heart dimensions are normal to small. No tumors or effusions are appreciated. The ECG is unremarkable with a sinus tachycardia.

Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to 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. If not performed, a heartworm antigen test is recommended. Given the chronicity of the disease seen here (no chronic case history provided), 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/pleural effusion), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given the recent history of respiratory signs and crackles, 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. **I would not utilize a diuretic, as this patient has no risk for left-sided CHF making the radiographs likely more consistent with airway disease. There may be risk for right-sided CHF in the future; however, no effusions are noted making this unlikely.** If the patient experiences any additional respiratory compromise, continued hospitalization for oxygen support and IV antibiotics may be necessary. Finally, the patient is volume contracted, likely due to Lasix therapy and cautious fluid administration may be beneficial.

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

Discontinue Lasix as discussed. Consider fluids. Continue Pimobendan 0.3mg/kg PO q12h. Institute sildenafil (Viagra) 1-2mg/kg PO q8h. If respiratory signs persist, consider course of Baytril or similar. Can also use hydrocodone and/or theophylline depending on chronic clinical signs of cough/exertional dyspnea.

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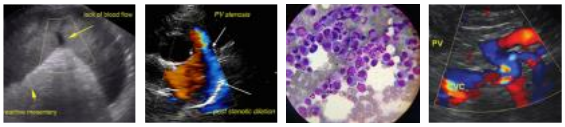

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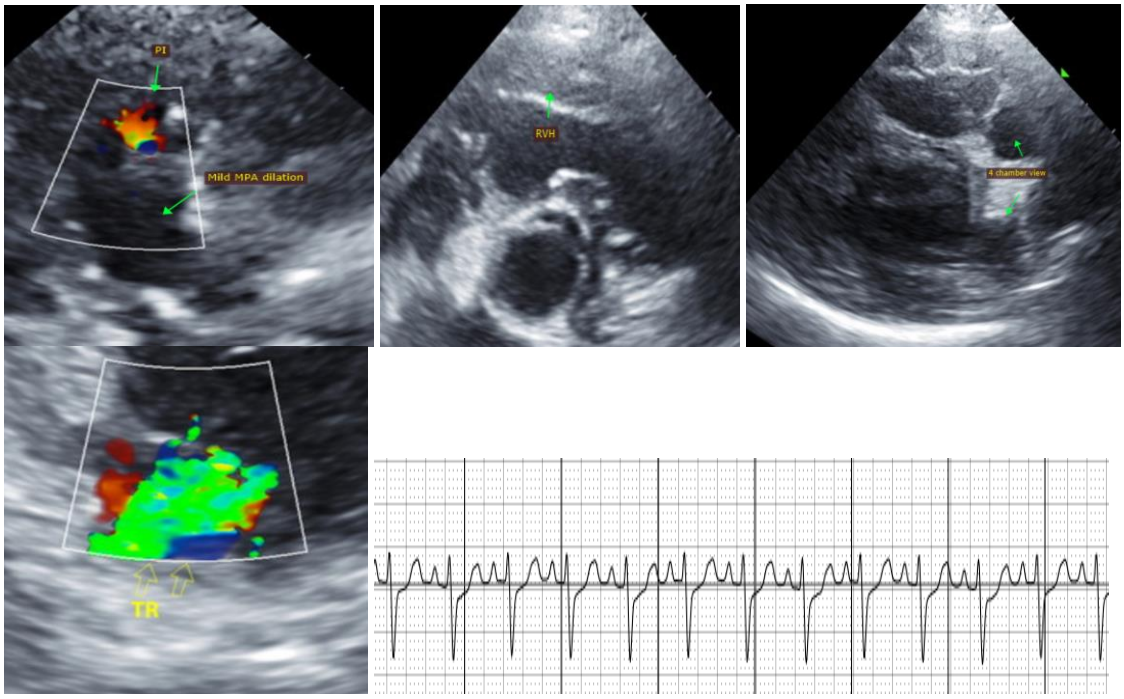
Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any development of clinical signs.

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