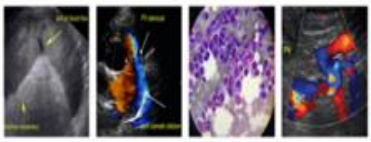
Mass Veterinary Services



SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

PATIENT
Michelle Gawron

SPECIES
Canine

BREED
Chihuahua

SEX
Female Spayed

AGE
14 years

WEIGHT
12.81lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Pamela Harrigan, RDCS

HOSPITAL NAME
Mass Veterinary Services

REFERRING VET
Dr. Masloski

INVOICE
25408

DATE
7/19/22

PRESENTING CLINICAL SIGNS

History: Michelle has a historical diagnosis of pulmonary hypertension treated with Sildenafil. She presented to ER on 4/1/22 for trouble breathing and was oxygen dependent for one day, then stable on room air. Echocardiogram was performed to assess for any therapy adjustment that might be indicated (see below). Currently, she has a mild cough. Good appetite with normal activity for her. On exam today: NSR, grade III/VI murmur with PMI right lateral thorax, PSS, lung fields clear, mm pink to cyanotic when stressed. BP: 70 mmHg x 5. Current medications: 1) Sildenafil 20mg 1/2 tab twice a day 2) Lasix/furosemide 12.5mg 1/2 tab twice a day 3) Enalapril 5mg 1/4 tab daily 4) Hydrocodone with atropine/hycodan 5mg Plan: Discontinue Enalapril *No sedation for study.
-Pertinent previous echo findings (4/1/22): LA:Ao 1.14; LV 1.75 cm; normal LA/LV; severe RAE/RVE; severe TR (3.7 m/s; 56 mmHg).

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; 25mm/s, 20mm/mV. The average heart rate is 150bpm with an irregular rhythm. P for every QRS complex and vice versa. Isolated APCs are seen throughout; singles only. No ventricular premature beats, pauses or dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with isolated APCs.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and Doppler imaging is available.
Left ventricle: The LV diameter is normal with adequate myocardial function. LV wall thicknesses are normal.
Left atrium: The left atrium is normal.
Mitral valve: The mitral valve is mildly thickened with no prolapse into the left atrial lumen. Mild eccentric mitral regurgitation**.** Normal velocity.
Aortic valve/Aorta: The aortic valve is normal in morphology and mobility. Normal aortic outflow velocity; laminar flow. Trace aortic insufficiency.
Right ventricle: Severe RV dilation. Mild RV hypertrophy.
Right atrium: Severe RA dilation.
Tricuspid valve: The tricuspid valve appears mildly thickened with no prolapse. Severe tricuspid regurgitation; velocity consistent with moderate pulmonary hypertension; however, this is thought to be an underestimation.
Pulmonic valve/Pulmonary artery: The pulmonic valve is normal in morphology and mobility. Trivial pulmonic insufficiency. Normal RVOT velocity; laminar flow. Mild MPA and branch dilation.
Pericardium/other: No pericardial or pleural effusion noted. No obvious cardiac masses.

2-Dimensional Measurements

Ao diam (cm)	1.6
LA diam (cm)	1.9
LA:Ao (Swe)	1.2
IVS thickness (cm)	0.55
LVID diastole (cm)	2.0
PW thickness (cm)	0.56
LVID systole (cm)	0.88
FS (%)	60

Doppler Measurements

PV Vmax (m/s)	0.94
AoV Vmax (m/s)	1.2
MR Vmax (m/s)	6.1
TR Vmax (m/s)	3.5
TR PG (mmHg)	50

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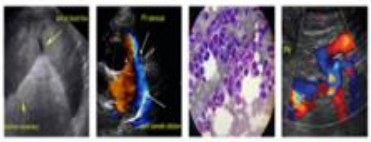

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INTERPRETATION OF THE FINDINGS

Pulmonary hypertension (PAH) is present, as evidenced by a hypertrophied and dilated right heart and significant TR with an elevated TR velocity. The estimated systolic pulmonary arterial pressure is 60-80mmHg, with normal being <25mmHg (velocity thought to be an under-estimation). This is causing pressure overload of the right ventricle. The left heart is normal in dimension with mild MR, indicating low risk for complication such as left-sided CHF. No additional issues are identified. Compared to what is available from the prior study, these findings are actually quite similar.

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. If not performed, a heartworm antigen test is recommended. Given the chronicity of the disease seen here, COPD/chronic bronchitis and/or primary PF as an underlying cause. 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.

The most common cause of labored breathing in these cases is an infectious or inflammatory insult causing a decline in already poor oxygenation status. This is suspected to be the cause of the prior labored breathing episode. Typically, Lasix is contraindicated as **diuretics can actually further reduce preload** in cases of debilitating PAH and worsen clinical signs. Unless right-sided CHF (pleural or abdominal effusion) was noted, Lasix is likely unnecessary. Additionally, Enalapril should be discontinued due to significant hypotension. Finally, Pimobendan does has some vasodilatory benefit in these cases and is recommended as below.

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.

Isolated APCs are noted on the ECG. These are not surprising given significant right atrial enlargement in a stressed patient. What is seen here does not warrant therapy; however, monitor for signs of persistent arrythmias at home is recommended (acute collapse or lethargy).

Prognosis is guarded until progression is evaluated.

RECOMMENDATIONS

- Unless CHF was documented at the ER, Lasix can be discontinued.
- Discontinue Enalapril due to hypotension.
- Institute Pimobendan 0.3mg/kg PO q12h.
- Continue Sildenafil and Hydrocodone as prescribed.
- Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.
- Elective anesthesia is not advised at this time.

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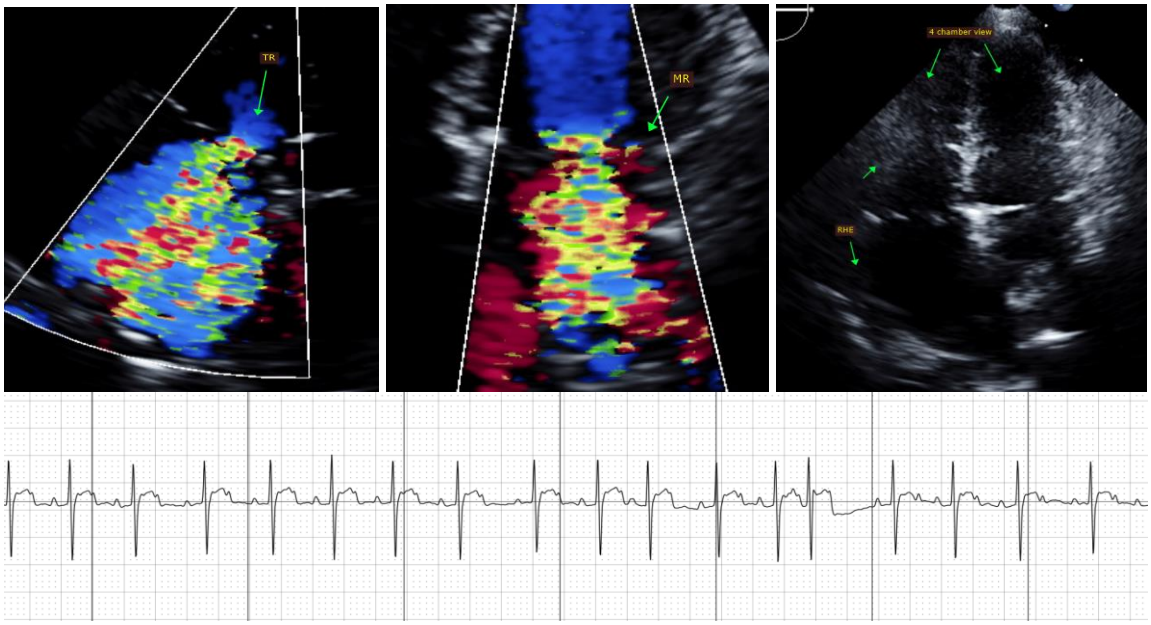
- Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes.

PLAN

- Recommend conservative monitoring with a recheck echocardiogram in 6 months, 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

Echocardiogram performed by: Pamela Harrigan, RDCS
Pet Animal Ultrasound Service (4paus.com)