SonoPath
Clinical Sonography & Telecytology
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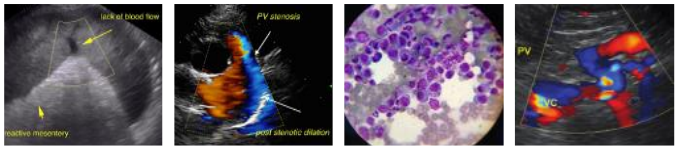

SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT
Maddison Hayas

SPECIES
Canine

BREED
Chihuahua

SEX
Female Spayed

AGE
16 years

WEIGHT
8.2lbs

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

IMAGING PERFORMED BY
Dana Alterman, RDCS, LVT

HOSPITAL NAME
Roadrunner Veterinary Emergency & Specialty Hospital

REFERRING VET
Dr. Rouse

INVOICE
29962

DATE
3/30/23

PRESENTING CLINICAL SIGNS

History: Presented to ER for cough, hack, labored breathing, SPO2 89% on room air. Hospitalized on judicious fluids for one day. Next morning grade 2/6 left systolic murmur was ausculted.

ELECTROCARDIOGRAPHIC FINDINGS

A six lead ECG is available at 25mm/s; 10mm/mV. The average heart rate is 140bpm (range 115-166bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P wave morphology is positive with a normal dimension. Normal PR. The QRS morphology is positive with normal dimension. MEA is indeterminate. No ectopic beats, pauses or dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with respiratory variation.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Mild diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. Trivial mitral regurgitation with no left atrial dilation. Normal MR velocity. Normal LV diameter with adequate myocardial function. The tricuspid valve appears normal with mild tricuspid regurgitation. TR velocity consistent with mild to moderate pulmonary hypertension. Mild right atrial prominence. Mild RV prominence without significant hypertrophy. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No significant MPA or branch dilation. No obvious aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No obvious cardiac masses.

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	4.8	3.5	1.4	1.2	66	94	0.2
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	0.80	0.82	3.7	1.1	2.0	0.7
*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)
				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)

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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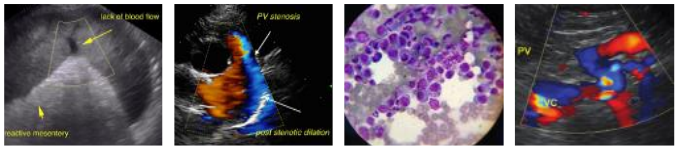

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Pulmonary hypertension (PAH) is present, as evidenced by an elevated TR velocity and right heart enlargement. The estimated systolic pulmonary arterial pressure is mild to moderate (50mmHg), with normal being <25mmHg. Minimal right heart enlargement is seen. The left heart is normal with trace MR and no additional issues are identified. The ECG is unremarkable with a respiratory sinus arrythmia.

Given the history or presenting for a cough and labored breathing, this is likely the underlying cause which has led to acute pulmonary hypertension based upon no chronic signs. Patient with With progressive PAH and pulmonary disease can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled. It is important to note, the cough is not caused by PAH; rather PAH develops secondary to the cough. Adequate treatment of the respiratory disease will help slow progression in PAH long term. Sildenafil can be instituted if the patient has or develops specific symptoms of PAH (exertional dyspnea/weakness/collapse).

As there is a recent history of an increase in respiratory symptoms, the most common cause is an infectious or inflammatory insult causing a decline in already poor oxygenation status. A PTE cannot be ruled out particularly if there is no chronic cough history. The current approach to respiratory disease is reasonable, with addition of hydrocodone if needed. Use of theophylline and/or taper course of anti-inflammatory steroids can also be beneficial in these cases depending on response, to treat exertional dyspnea or acute flare ups and decrease the inflammatory component as much as possible. The prognosis overall is guarded long term.

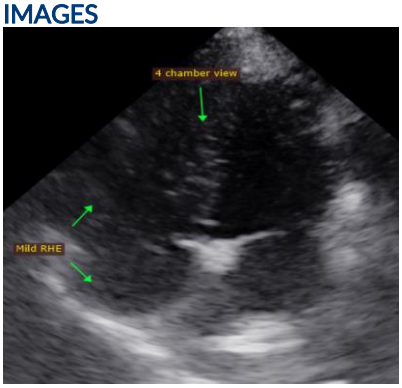
Omega fatty acid supplementation (anti-inflammatory) may be of some long-term benefit. Monitor for worsening of labored breathing, exercise intolerance or collapse episodes.

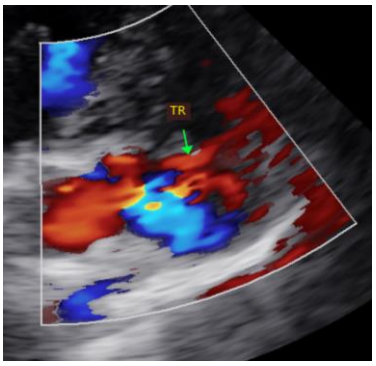
PLAN:

If the patient has or develops symptoms of PAH as discussed, institute sildenafil (Viagra) 1-2mg/kg PO q8h. Continue respiratory therapy and workup is recommended, including but not limited to: Hydrocodone, Baytril/Enrofloxacin, Theophylline, etc. Baseline CXR is strongly recommended.

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

IMAGES





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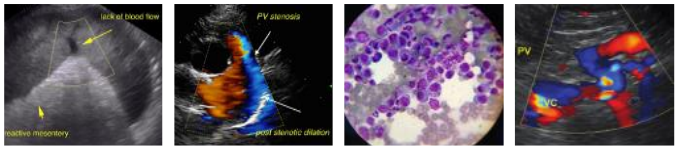

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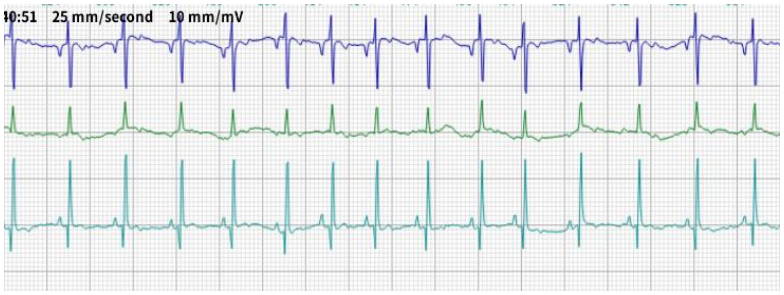

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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