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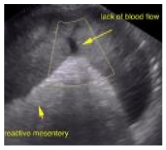
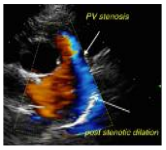
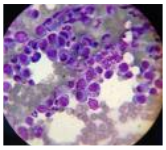
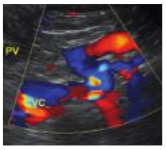

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1-800-838-4268 info@sonopath.com

PATIENT
Lucy Cogar

SPECIES
Canine

BREED
Maltese Mix

SEX
Female Spayed

AGE
13 years

WEIGHT
16lbs

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

IMAGING PERFORMED BY
Dana Alterman, RDCS, LVT

HOSPITAL NAME
Eubank Animal Clinic

REFERRING VET
Dr. Harrell

INVOICE
22986

DATE
3/8/22

PRESENTING CLINICAL SIGNS

History: Presented this am in respiratory distress. Heart murmur, grade 5/6. Gave Lasix 2mg/kg and Pimobendan 2.5mg and put in oxygen chamber; has improved was stable off O2 for echo. Acute episode last summer of coughing - improved but is now chronic.

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 95bpm (range 85-107bpm). 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: Respiratory sinus arrythmia.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Club-like anterior mitral valve leaflets with mild prolapse into the left atrial lumen. Mitral regurgitation is identified with a normal left atrial dimension. Normal LV diameter with adequate myocardial function. Septal flattening in systole. The tricuspid valve appears thickened with septal prolapse and severe tricuspid regurgitation. Velocity is elevated consistent with severe pulmonary hypertension. Severe right atrial enlargement; severe right ventricular dilation and hypertrophy. The pulmonic and aortic valves are normal in morphology and mobility. Significant MPA and branch dilation. Mild pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion noted. 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	4.9	NM	1.2	52	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	NM	1.0	1.0	7.3	1.6	2.1	1.1
*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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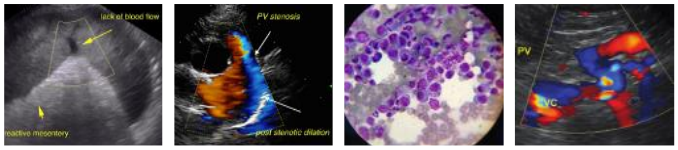

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The diagnosis is severe pulmonary hypertension (PAH), based upon an elevated TR velocity and right heart/MPA enlargement. The right heart is significantly affected with evidence of chronic pressure overload. There is also mitral valve degeneration; however, comparatively the left-sided disease is well compensated for and of little concern. No additional issues are identified. The ECG shows a respiratory sinus arrythmia, which supports a primary respiratory issue.

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. A historical heartworm infection or prior severe lung infection (such as distemper) would also be possible. In a patient with reported chronic respiratory issues, this is likely the underlying issue. Highly recommend baseline chest radiographs with a Radiologist review for further pulmonary evaluation. 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 apparently acute on chronic history of respiratory signs, the most common cause is an infectious or inflammatory insult causing a decline in already poor oxygenation status. A PTE cannot be entirely ruled out, however is unlikely due to the severity of chronic RV changes. Coverage with broad spectrum pulmonary antibiotic (fluoroquinolone) is recommended, in addition to aggressive vasodilation using pimobendan and sildenafil. Discontinue Lasix in this case as diuretics can actually further reduce preload and worsen clinical signs. Continue hospitalization for oxygen support and IV antibiotics is likely necessary. Prognosis is guarded to poor, however if the patient can be stabilized hopefully, we can provide relief for a matter of months going forward.

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 hospitalization depending on clinical instability. Baseline CXR with Radiologist review when able. Institute course of pulmonary antibiotics (Enrofloxacin or similar) +/- oxygen for supportive care. Institute sildenafil (Viagra) 1-2mg/kg PO q8h. Institute Pimobendan 0.3mg/kg PO q12h. 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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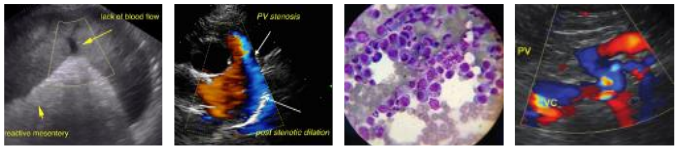

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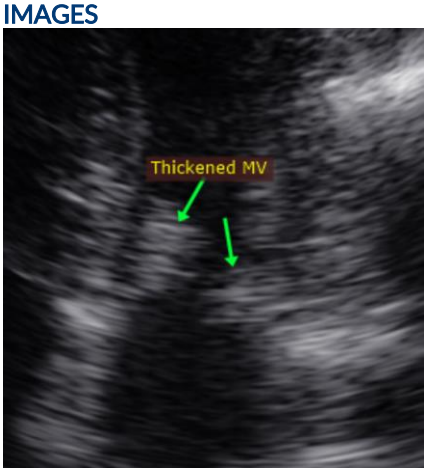
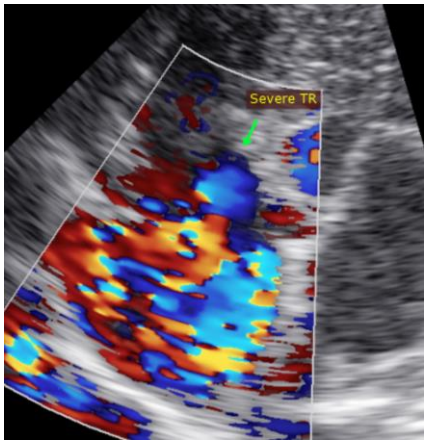
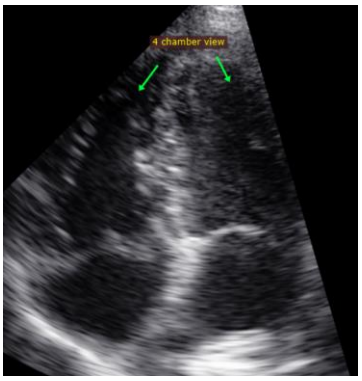
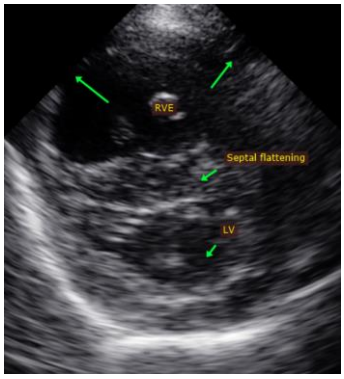
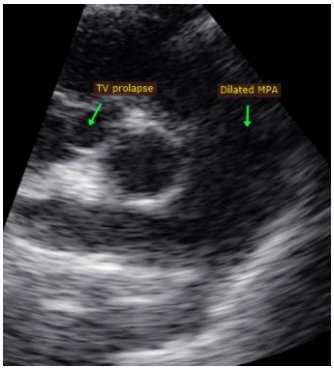
IMAGES











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

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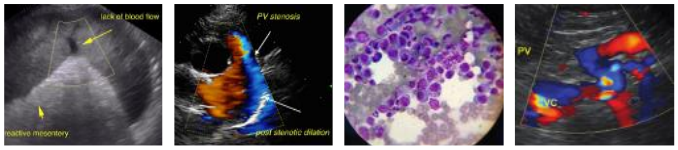

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