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Clinical Sonography & Telecytology
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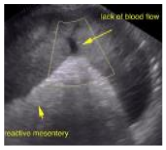
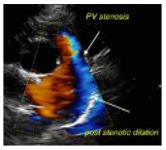
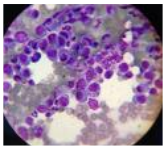
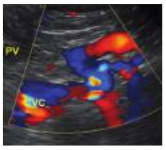

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1-800-838-4268 info@sonopath.com

PATIENT
Skeeter Sharif

SPECIES
Canine

BREED
Shih Tzu

SEX
Female Spayed

AGE
14 years

WEIGHT
10.1lbs

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

IMAGING PERFORMED BY
Kelly Romero

HOSPITAL NAME
Fort Collins Veterinary Emergency Hospital

REFERRING VET
Dr. Romero

INVOICE
32319

DATE
8/11/23

PRESENTING CLINICAL SIGNS

History: Presented for respiratory distress. First time suspected seizure (vs. syncope) 2 days ago. History of back pain. Also, tracheal collapse dx 8 months ago. Was placed on a cough suppressant for cough but didn't help. Cough had not been an issue recently. Also being treated for allergies with apoquel. Grade III-IV/VI systolic heart murmur L and R sided, crackles bilaterally, BP: 144mmHg.
-Abnormal PE/Chem/CBC/UA Results: Blood gas panel showed normal renal values and lactate elevated at 4.7. In house 4Dx including heartworm was negative.
-CXR report: Moderate to severe bronchial pattern. MPA bulge. No left heart enlargement.
-Current medications: Started Unasyn, Baytril and sildenafil (5 mg TID)

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve leaflets with mild prolapse into the left atrial lumen. Mild eccentric mitral regurgitation with a mild left atrial enlargement. Normal LV diameter with adequate myocardial function. Evidence of pseudohypertrophy. The tricuspid valve appears mildly thickened with mild tricuspid regurgitation. Mild right atrial enlargement. No significant right ventricular dilation with moderate hypertrophy consistent with pulmonary arterial hypertension. TR velocity consistent with severe PAH. The pulmonic and aortic valves are normal in morphology and mobility. Moderate main PA and branch dilation. Mild pulmonic and no aortic 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	NM	5.0	1.5	1.5	55	92	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	0.9	0.9	4.6	1.7	2.2	1.0
*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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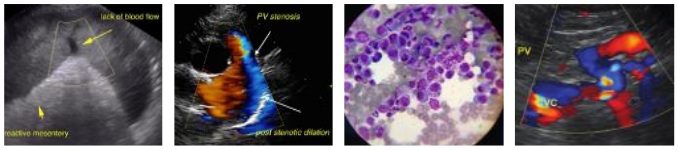

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is present, 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 of the right heart and MPA (indicating right-heart pressure overload). Mild MR is also present with mild left atrial enlargement, which suggests this is hemodynamically well compensated for, No additional issues are identified.

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 signalment and reported cough, COPD/chronic bronchitis and/or upper airway disease 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 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 or similar) is recommended, in addition to aggressive vasodilation using Sildenafil. 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. The patient does appear volume under-loaded and maintenance fluids may be warranted.

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 Sildenafil (Viagra) 1-2mg/kg PO q8h. Consider course of antibiotics as discussed. Consider fluid therapy as discussed. Can also use more aggressive hydrocodone and/or theophylline depending on chronic clinical signs of cough/exertional dyspnea.

Reassess breathing status, CXR and BP in 1-2 weeks.

Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any recurrent clinical signs in the interim.

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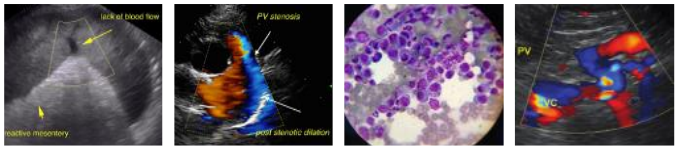

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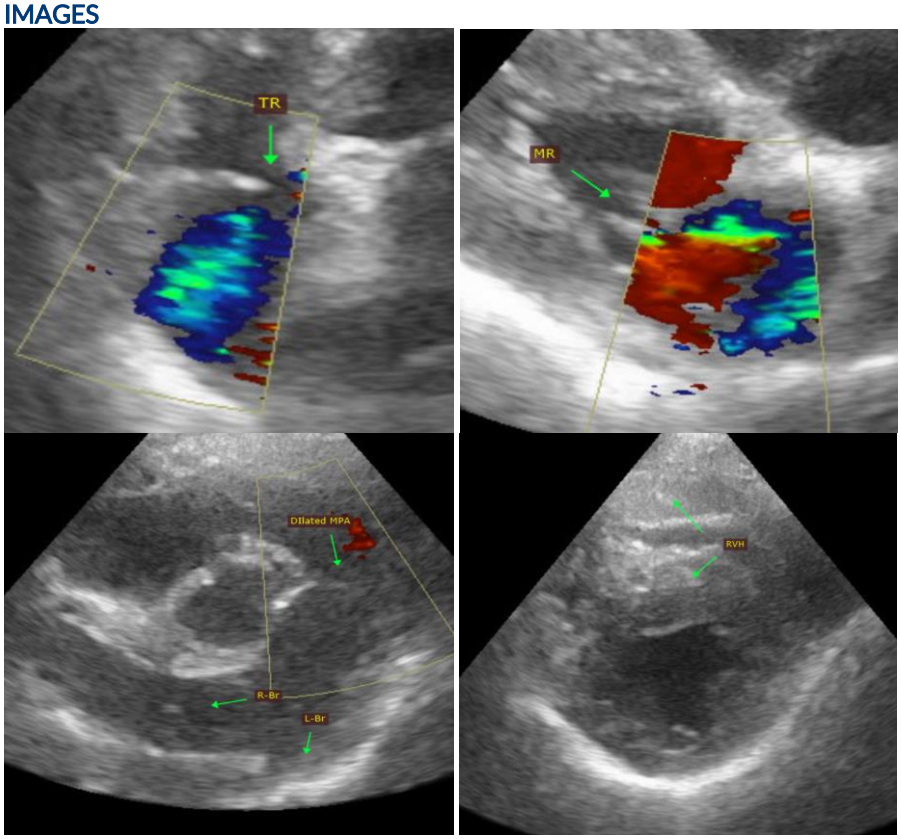
IMAGES



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