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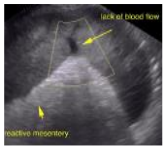
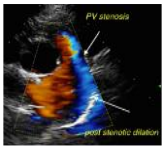
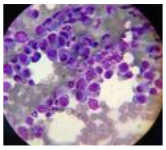
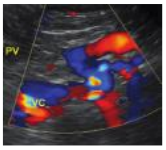
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™

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

PATIENT
Jimmy Kim

SPECIES
Canine

BREED
Shih Tzu

SEX
Male Neutered

AGE
15 years

WEIGHT
15lbs

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

IMAGING PERFORMED BY
Shari Reffi, CVT

HOSPITAL NAME
Hillsdale Animal Hospital

REFERRING VET
Dr. Fishcer

INVOICE
23808

DATE
4/21/22

PRESENTING CLINICAL SIGNS

History: Several episodes of collapse recently. Heart murmur.
-Current medications: Furosemide 6.25mg bid.
-Abnormal PE/Chem/CBC/UA Results: BUN 47, Creat 1.1, SAP 222, ALT 134, USG 1.017, PH 5.

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

Mild cardiomegaly. No obvious evidence of CHF.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets with prolapse into the left atrial lumen. Moderate to severe mitral regurgitation with moderate left atrial enlargement. Minimal LV dilation with adequate myocardial function. The tricuspid valve appears mildly thickened with moderate tricuspid regurgitation. Velocity consistent with severe pulmonary hypertension. Mild right atrial enlargement; mild right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. Subtle systolic flattening of the IVS consistent with pressure overload. The pulmonic and aortic valves are normal in morphology and mobility. Mild MPA and branch dilation. Trace pulmonic and no aortic 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	5.1	4.6	1.8	1.9	55	88	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	180	0.9	0.6	6.8	2.5	2.9	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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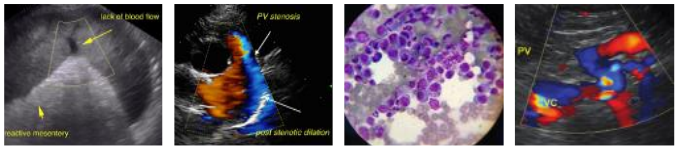

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

There is severe pulmonary hypertension (PAH) present, as evidenced by an elevated TR velocity and significant right heart compensatory changes. The estimated systolic pulmonary arterial pressure is >80mmHg, with normal being <25mmHg. This is causing right heart and MPA enlargement indicative of right heart pressure overload. There is also moderate mitral valve disease with LA enlargement and a moderate to severe mitral regurgitation. This should certainly also be monitored going forward.

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. Given the breed, further historical respiratory historical information should be obtained if able. This signalment is predisposed to chronic airway disease and if present the cough should also be addressed. Patients with this degree of PAH can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given reported syncope, medical management with Pimobendan and Sildenafil is certainly indicated as below. Lasix should be discontinued, as the risk for CHF is relatively low at this time and diuretics can further decrease preload in patients with pulmonary hypertension. If there was acute worsening of a cough, Baytril or similar antibiotic may also be useful. As mentioned previously, adequate cough control is also key to managing these cases if present.

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 improved 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. Prognosis is guarded going forward due to the complexity of issues. Patient will always be at risk for right or left-sided CHF, development of arrythmias and/or sudden death going forward.

PLAN:

Discontinue Lasix. Institute sildenafil 1-2mg/kg PO q8h. Continue Pimobendan at 0.3mg/kg PO q12h. Consider fluoroquinolone if indicated. Consider hydrocodone as needed up to every 4-6hours PRN for cough if indicated.

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

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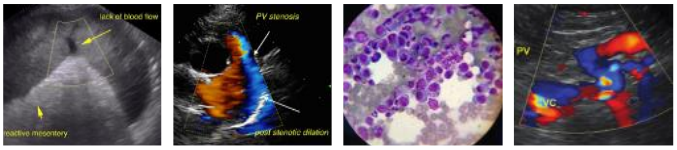

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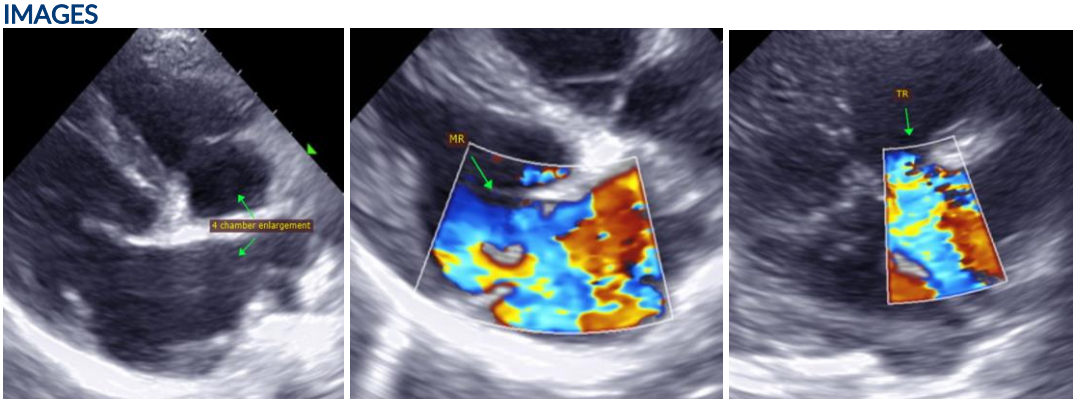
IMAGES



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)
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