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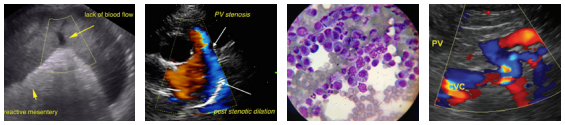


ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Anonymized

SPECIES
Canine

BREED
Poodle

SEX
Female Spayed

AGE
10 Years

WEIGHT
13.4 lbs = 6.09 kgs

INTERPRETED BY
Maggie Machen Lamy DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY
Amanda Lacey Clinical Sonographer

HOSPITAL NAME
Anonymized

REFERRING VET
Anonymized

INVOICE
Anonymized

DATE
3/12/17

PRESENTING CLINICAL SIGNS

History: Labored breathing, diffuse crackles, tachycardic. HR 220bpm, RR 48. Medications started yesterday (9/5): lasix 12.5mg q12h (4mg/kg/day), enalapril 2.5mg q12h, vetmedin 1.25mg q12h.

Radiographs submitted for supplemental information only: Severe cardiomegaly, VHS 13. Pulmonary edema.

ECHOCARDIOGRAM FINDINGS

Heart

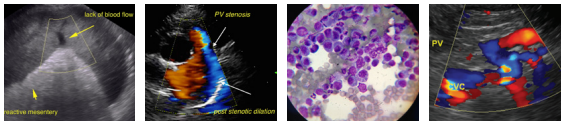
Severe left ventricular dilation with diminished systolic function. LVFW affected more than the IVS, although global decline noted. Increased sphericity. Increased EPSS. Severe left atrial enlargement. The mitral valve appears normal in form and function, with no obvious prolapse into the left atrial lumen. Mild central mitral regurgitation secondary to annular stretch. Decreased MR velocity consistent with systolic failure. Decreased LV wall thickness. The tricuspid valve appears normal in form and function. Moderate right atrial and ventricular dilation. Mild tricuspid regurgitation due to annular stretch. TR velocity is elevated; PG 64mmHg consistent with moderate pulmonary hypertension. The aortic valve is normal in morphology and mobility. Normal LVOT velocity. No aortic insufficiency. Normal pulmonic valve with trace pulmonic insufficiency seen. No pericardial or pleural effusion noted. No obvious cardiac tumors.

CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (Boon method)	LA/AO (Heart Base)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	<1.3	1.6	28-40	40-100	0.03-0.77
PATIENT	4.23	3.95	2.6		9.35		

CANINE CARDIAC PARAMETERS	HR (BPM)	LVOT VELOCITY (m/s)	RVOT VELOCITY (m/s)	BODY WEIGHT (kg)	LA 2D 4-chamber long axis AS to FW (Rishniw) (cm)	LVIDd (Rishniw) (cm)
NORMAL PARAMETER	50-100	1.0-2.0	0.75-1.3	BELOW	BELOW	BELOW
PATIENT	NP	0.94	0.5	6	2.6	4.02
				5	1.0-1.85	2.2-3.2
				10	1.3-1.9	2.9-3.5
				15	1.6-2.1	3.5-3.9
				20	1.8-2.3	3.9-4.3
				25	1.9-2.4	4.2-4.6
				30	2.0-2.7	4.5-5.1
				35	2.0-2.9	4.6-5.6
				40	2.1-3.2	4.8-6.0
				45	2.1-3.4	5.0-6.4
				50	2.1-3.6	5.2-6.8

BODY WEIGHT DEPENDENT PARAMETERS >

Adapted from June Boon, Veterinary Echocardiography, 1998
Rishniw M and Hollis NE. Evaluation for Four 2-Dimensional Echocardiographic Methods of Assessing Left Atrial Size in Dogs. J Vet Intern Med 2000; 14:429-435.
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995



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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately this patient has end-stage cardiomyopathy and systolic dysfunction. This is causing dilation and overload of all 4 chambers, resulting in insufficiency of the mitral and tricuspid valves. The degree of dilation and pump failure is resulting in congestive heart failure (pulmonary edema), in addition to reported tachycardia. Pulmonary hypertension is also documented, however I would not treat this specifically until the current respiratory crisis is controlled and pressures reassessed.

Systolic failure can be primary in nature (DCM) or secondary to taurine deficiency, myocarditis, tachycardia-induced cardiomyophathy, or infiltrative disease such as lymphoma. In an older small breed dog, primary DCM would be extremely rare.

Consider testing for primary causes that may be treatable. A troponin (cTnI) level can be submitted to further investigate infiltrative/inflammatory contribution (myocarditis). Additionally a taurine level may be helpful (screen for malabsorption issue). Finally, further systemic evaluation for underlying infiltrative contribution such as neoplasia is also reasonable (abdominal ultrasound, fluid cytology, etc). Regardless of cause, prognosis is poor to grave at this stage in the disease process, with an average survival time of <6 months. The only treatable cause of systolic failure is taurine deficiency, which is uncommon on commercially formulated dog foods. If a taurine level is declined, it is also reasonable to simply supplement with taurine on the off chance of a malabsorption issue.

Continuation of full cardiac supportive medications is recommended as below. Cases of systolic failure are at high risk for malignant tachyarrhythmias (such as VT) and sudden death, and a baseline ECG is recommended particularly in light of the tachycardia.

Omega fatty acid supplementation and mild salt restriction may be of some long term benefit. Monitor for development of a cough, worsening labored breathing, exercise intolerance or collapse episodes in the future. Monitoring of sleeping breathing rates at home is recommended to assess response to medications and recurrence of CHF in the future.

PLAN: Recommend baseline ECG and blood pressure. If hypotensive, discontinue Enalapril until reassessment/normotensive. If BP>120mmHg, continue vasodilator Enalapril 2.5mg PO q12h. Continue furosemide 12.5mg PO q12h (4mg/kg/day). Continue Pimobendan at increased dose: Give 2.5mg in the am, 1.25mg in the pm. Initiate aldosterone antagonist Spironolactone 25mg tabs, ¼ tab PO q12h.

Assess renal panel and clinical response in 1-2 weeks. Consider cTnI, taurine level, AUS as discussed above. Alternatively, can supplement taurine 500mg PO BID.

Recheck echocardiogram in 2-3 months to reassess cardiac function and pulmonary pressures.

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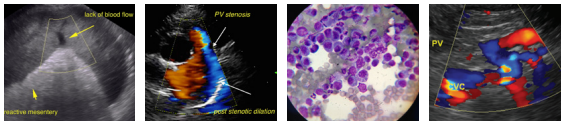

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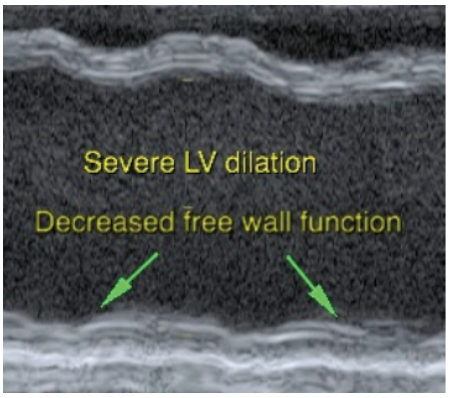

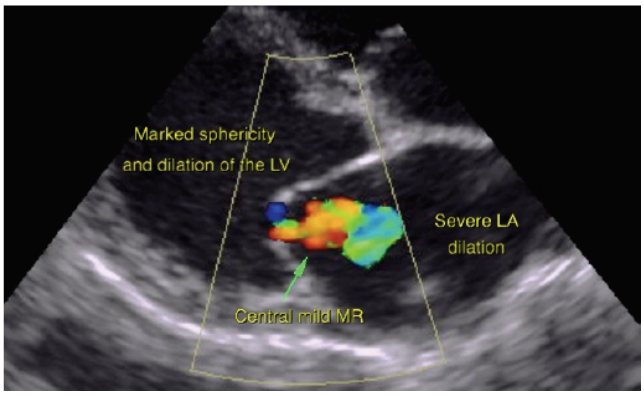

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

Thank you for this referral. 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, DVM
Diplomate of American College of Veterinary Internal Medicine (Cardiology)
info@sonopath.com