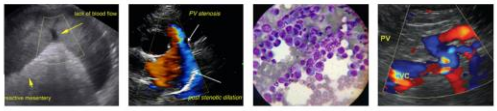
Mass Veterinary Specialty Services
1-413-734-1292



SonoPath
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PATIENT
Noodle Ngo

SPECIES
Canine

BREED
Labrador Retriever Mix

SEX
Male Neutered

AGE
8 years

WEIGHT
54lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Pamela Harrigan, RDCS

HOSPITAL NAME
Mass Veterinary Specialty Services

REFERRING VET
Dr. Masloski

INVOICE
21254

DATE
9/28/21

PRESENTING CLINICAL SIGNS

History: Noodle was seen mid-August at Pieper Memorial for dyspnea and was noted to be in congestive heart failure. He had pleural effusion that was tapped, and he was started on Lasix and pimobendan with diltiazem added for atrial fibrillation. Noodle is presently eating well with no noted C/S/V/D/PU/PD although his stools are a bit on the soft side. Noodle did have some on-going coughing prior to his ER visit. CV/RESP: irregularly regular rhythm consistent with atrial fibrillation, no obvious murmurs noted, PSS, lung fields clear. BP: 260-280mmHg.
-Current medications: 1) Pimobendan/vetmedin 5mg 1 tab twice a day 2) Lasix/furosemide 50mg 1 tab twice a day 3) Diltiazem 30mg 2 tabs three times a day *No sedation.

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; 25mm/s, 10mm/mV. The average heart rate is 220bpm (range 200-280bpm). No identifiable P waves with an irregularly irregular rhythm. No ventricular premature beats identified.
ECG diagnosis: Rapid atrial fibrillation.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and Doppler imaging is available.
Left ventricle: The LV diameter is severely increased with marked systolic dysfunction. LV wall thicknesses are decreased with increased sphericity.
Left atrium: The left atrium is moderately dilated.
Mitral valve: The mitral valve is mildly thickened with no prolapse into the left atrial lumen. Moderate central mitral regurgitation.
Aortic valve/Aorta: The aortic valve is normal in morphology and mobility. Normal aortic outflow velocity; laminar flow. No aortic insufficiency.
Right ventricle: Mildly dilated right ventricle.
Right atrium: Mild RA dilation.
Tricuspid valve: The tricuspid valve appears normal with trace tricuspid regurgitation.
Pulmonary valve/Pulmonary artery: The pulmonic valve is normal in morphology and mobility. No pulmonic insufficiency. Normal RVOT velocity; laminar flow.
Pericardium/other: No pericardial or pleural effusion noted. No obvious cardiac masses.

2-Dimensional Measurements

Ao diam (cm)	2.2
LA diam (cm)	3.8
LA:Ao (Swe)	1.7
IVS thickness (cm)	1.0
LVID diastole (cm)	5.9
PW thickness (cm)	0.87
LVID systole (cm)	5.3
FS (%)	9

Doppler Measurements

PV Vmax (m/s)	0.5
AoV Vmax (m/s)	1.47
MR Vmax (m/s)	5.4
TR Vmax (m/s)	NM
TR PG (mmHg)	NA

INTERPRETATION OF THE FINDINGS

Severe LV dilation with systolic dysfunction and an increased end-systolic dimension is identified. MR and TR are secondary to dilation and are clinically insignificant at this time. The LA is moderately enlarged as well, indicating high risk for congestive heart failure. The right heart is also mildly affected, although to a lesser extent.

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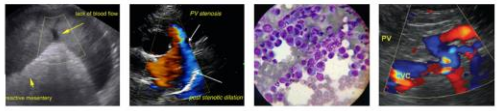

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Systolic failure can be primary in nature (DCM) or secondary to taurine deficiency, myocarditis, tachycardia-induced cardiomyopathy, or infiltrative disease such as lymphoma. In an 8-year-old mixed breed, all possibilities should be considered. A thorough diet history with avoidance of grain-free/boutique brand options is recommended. Additionally, a thyroid status should be assessed. Regardless of cause, prognosis is poor at this stage in the disease process, with an average survival time of <6 months. Patient will always be at risk for recurrent CHF, development of malignant arrhythmias and/or sudden death in the future.

As a complicating factor, the patient has also developed atrial fibrillation (AF) secondary to atrial dilation. This was noted on the August exam with institution of Diltiazem. Tachycardia of any origin (when sustained) leads to right sided congestion (as was seen with pleural effusion). AF is characterized by disorganized contractions of the atria leading to an irregular heart rhythm. The heart rate is poorly controlled based upon the included ECG, with rates as high as 280bpm. Given that the patient is on a relatively high dose of Diltiazem already, ancillary therapy with Digoxin is recommended as below, with a target heart rate of 140-160bpm stressed. Once a patient is in AF, this will likely never convert back to sinus rhythm, however they typically do well with simply rate control. The structural disease and development of AF/CHF requires lifelong diuretics and management of the structural disease in addition to management of the heart rate as below.

Slight alterations to the medications are recommended as below, including institution of Spironolactone. Additionally, an ACE-I is certainly recommended based upon use of Lasix in addition to a severely elevated blood pressure. The blood pressure should be reassessed for accuracy as typically patients with this degree of disease are hypotension. If deemed to be accurate, full systemic screening is advised searching for primary causes of marked systemic hypertension such as an adrenal tumor.

Monitoring of sleeping respiratory rates will be paramount to screen for recurrent congestive heart failure at home in the future. Cough suppression to improve QOL can also be considered once diuretics are on board for any residual mechanical cough in the face of normal sleeping respiratory rates.

Prognosis is poor at this stage, with risk for recurrent congestive heart failure, malignant arrhythmias (AF, VT), collapse and/or sudden death in the future.

RECOMMENDATIONS

- Assuming the patient is doing well, continue Lasix/Diltiazem as prescribed.
- Dose increase: administer Pimobendan 7.5mg PO q12h.
- Institute Digoxin 0.005mg/kg PO q12h.
- Institute Spironolactone 1-2mg/kg PO q12h.
- Consider diet history and thyroid status as discussed.
- Institute Taurine 1000mg PO q12h.
- Consider hydrocodone with homatropine, 0.2 – 0.4 mg/kg PO up to q4-6 hours PRN for cough (available in 5/1.5mg tablets or 5mg/5ml solution).
- Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.
- Elective anesthesia is not advised.

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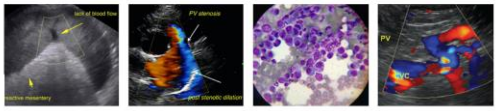

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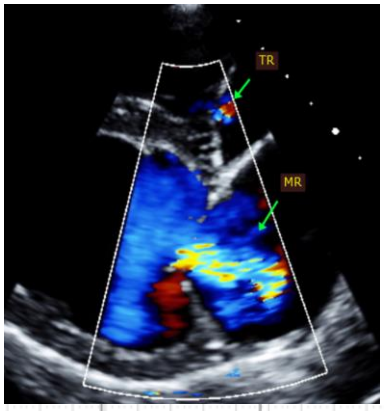
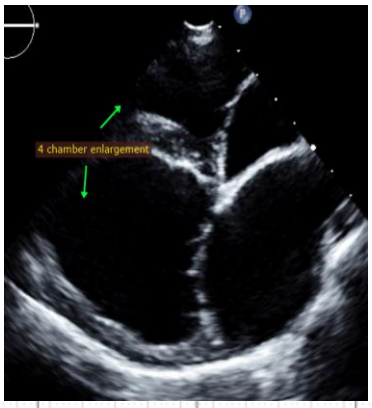
- Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes. Monitoring of sleeping breathing rates is recommended as the best way to screen for CHF going forward.
- Lifelong activity restriction is advised.

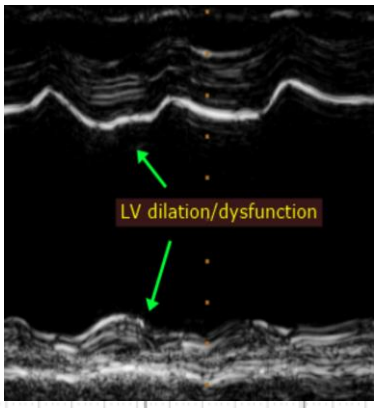
PLAN

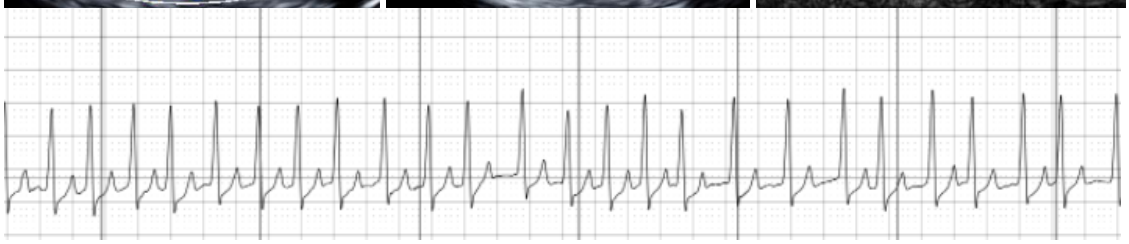
- Monitor renal values, ECG and Digoxin level in 5-7 days, 4-6 hours post-Digoxin administration. Target heart rate is 140-160bpm in hospital. Monitor every 4-6 months.
- Recommend conservative monitoring with a recheck echocardiogram in 6 months, sooner if any development of clinical signs.

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

Echocardiogram performed by: Pamela Harrigan, RDCS
Pet Animal Ultrasound Service (4paus.com)