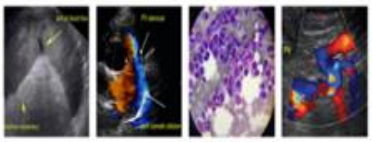
Mass Veterinary Services



SonoPath Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

PATIENT
Angel Hemphill

SPECIES
Canine

BREED
Cairn Terrier

SEX
Female Spayed

AGE
13 years

WEIGHT
13.10lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Pamela Harrigan, RDCS

HOSPITAL NAME
Mass Veterinary Services

REFERRING VET
Dr. Masloski

INVOICE
22764

DATE
2/23/22

PRESENTING CLINICAL SIGNS

History: Recheck echo. History chronic valvular disease - Stage B2. Current presentation: Angel was seen earlier this month for dyspnea and then again over the past few days. She was discharged this morning with an increased dose of Lasix (up to TID vs BID). Earlier in the month, her chest films revealed a cardiomegaly with moderate to severe broncho-alveolar pattern. She was started on pimobendan and Lasix. Films taken yesterday continued to reveal cardiomegaly with some enlarged pulmonary vessels, mild pleural fissure lines, patchy pulmonary infiltrates. Angel is currently on doxycycline for anaplasmosis. On auscultation today: arrhythmia, grade III/VI murmur with PMI left apical area, PSS, lung fields clear. BP: 120-130mmHg.
-Current medications: 1) Pimobendan/vetmedin 3.75mg 1/2 tab twice a day 2) Lasix/furosemide 12.5mg 1 tab three times a day 3) Doxycycline 100mg 1/4 tab twice a day 4) Spironolactone 25mg 1/2 tab daily *No sedation for study.
-Pertinent previous echo findings (1/29/20 MML): LA 2.0 cm; LA:Ao 1.56; LV 2.38 cm; mild LAE; trace-mild MR; no TR.

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. Two distinct rhythms are appreciated. Occasional sinus beats are noted after sinus pauses. Following each sinus beat is an brief run of paroxysmal SVT with a heart rate of 250bpm. Each time the SVT terminates there is a brief sinus pause, again followed by a sinus beat.
ECG diagnosis: Sinus bradycardia with inappropriate pauses and intermittent SVT; suspect sick sinus syndrome.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and Doppler imaging is available.
Left ventricle: The LV diameter is normal to slightly decreased with adequate myocardial function. LV wall thickness is increased.
Left atrium: The left atrium is mildly dilated.
Mitral valve: The mitral valve is mildly thickened with no prolapse into the left atrial lumen. Trace eccentric 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: The RV is prominent with mild RV hypertrophy.
Right atrium: Moderate RA dilation.
Tricuspid valve: The tricuspid valve appears mildly thickened. Moderate tricuspid regurgitation; velocity consistent with severe pulmonary arterial hypertension.
Pulmonic valve/Pulmonary artery: The pulmonic valve appears normal with normal mobility. Trace pulmonic insufficiency. Normal RVOT velocity; laminar flow. Mild MPA and branch dilation.
Pericardium/other: No pericardial effusion. Small volume pleural effusion noted. No obvious cardiac masses.

2-Dimensional Measurements

Ao diam (cm)	1.5
LA diam (cm)	2.1
LA:Ao (Swe)	1.4
IVS thickness (cm)	0.67
LVID diastole (cm)	2.3
PW thickness (cm)	0.67
LVID systole (cm)	0.8
FS (%)	65

Doppler Measurements

PV Vmax (m/s)	1.0
AoV Vmax (m/s)	1.3
MR Vmax (m/s)	NM
TR Vmax (m/s)	4.7
TR PG (mmHg)	87

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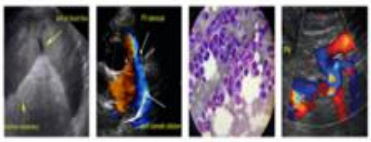

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INTERPRETATION OF THE FINDINGS

Chronic degenerative valve disease persists with unchanged left heart disease. Mild mitral regurgitation is hemodynamically insignificant, without volume overload of the left heart. This alone rules out left-sided CHF as the cause of the pulmonary appearance and clinical signs. Of much greater concern, there is now significant right-sided disease which was not present on the previous study. Tricuspid regurgitation has developed with a pressure gradient consistent with severe pulmonary hypertension. The right heart and MPA are enlarged as well supporting a pressure overload situation.

The underlying genesis of PAH is poorly understood in cases other than prior or active heartworm infestation. Though it occurs with increased frequency in a variety of forms of chronic lung disease and in patients with idiopathic pulmonary fibrosis. In this dog without a chronic history of respiratory signs, any of these are possible. Clinical signs of weakness, heavy breathing, cyanosis, and exertional syncope are attributed to severe PAH. Patients with this degree of PAH can eventually develop right-sided congestive heart failure, debilitating cyanosis and labored breathing/exertional syncope if poorly controlled.

Given these findings, the patient is certainly in need of lifelong cardiac support as below. No obvious right-sided congestion is seen here, and Lasix can be discontinued. If ascites or pleural effusion is noted in the future, this should be reconsidered. There is actually a volume underloaded appearance of the left heart, which will hopefully correct itself with discontinuation of Lasix. Primary respiratory causes of the clinical signs are considered more likely and broad-spectrum antibiotic therapy, oxygen support, etc. can be utilized until stable. Consider repeat CXR with a Radiologist review for further pulmonary evaluation.

The ECG shows a significant arrythmia as well. Intermittent SVT with a slow irregular sinus rhythm is appreciated. Looking at the previous report, there was a low resting heart rate at that time as well, which may suggest underlying progressive sick sinus syndrome. This puts us in a very difficult position, as treating the rapid arrythmia may cause extended sinus pauses and worsen clinical signs or vice versa. Given these two issues, I would not institute rate control at this time; however hospitalization for ECG monitoring may be advisable in the short term. My hope is that changing cardiac support as below and stabilizing the respiratory signs/volume status will help improve the underlying arrythmia. Should intermittent tachycardia persist however, highly recommend referral to a local Cardiologist as pacemaker implantation may have to be considered. Alternatively diltiazem can be cautiously attempted, with risk of complication. Sudden death is certainly a possibility in this case, and this should be relayed to the owner whether or not treatment is instituted.

Unfortunately, the prognosis is poor to grave in this case given the complexity of issues. My hope is that we can provide a good quality of life on medications for some time. The patient will always be at risk for recurrent right-sided CHF, development of syncopal episodes, malignant arrhythmias and/or sudden death in the future.

RECOMMENDATIONS

- Discontinue Lasix/spironolactone as discussed.
- Consider hospitalization for supportive care and ECG monitoring.
- Institute sildenafil 1-2mg/kg PO q8h.
- Continue Pimobendan 0.3mg/kg PO q12h.
- Institute Hydrocodone, a course of Baytril, etc. as needed for respiratory signs.
- If any question, repeat chest radiographs are recommended with a Radiologist review.

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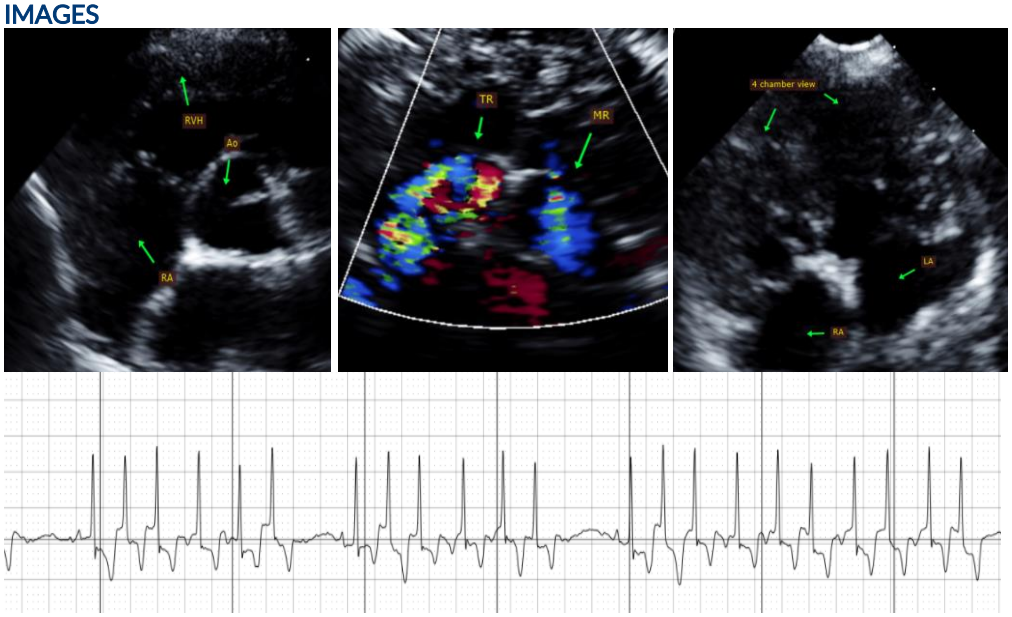
- Pending response, consider ancillary options including theophylline, anti-inflammatory prednisone, inhaled fluticasone, home flow by O2, etc.
- Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.
- Elective anesthesia is not advised.
- Lifelong activity/stress restriction is advised.
- Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes.

PLAN

- Recheck renal values, BP and ECG in 3-5 days once stabilized, then every 3-4 months lifelong.
- If persistent rapid arrythmias are noted, low dose Diltiazem is recommended 1-2mg/kg PO q12h. In this instance, highly recommend referral to a facility with a local Cardiologist.
- 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)