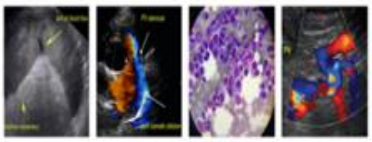
Mass Veterinary Services



SonoPath
Clinical Sonography & Telecytology
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PATIENT
Stella Kaufmann

SPECIES
Canine

BREED
Shetland Sheepdog

SEX
Female Spayed

AGE
10 years

WEIGHT
34lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Pamela Harrigan, RDCS

HOSPITAL NAME
Mass Veterinary Services

REFERRING VET
Dr. Masloski

INVOICE
24257

DATE
5/18/22

PRESENTING CLINICAL SIGNS

History: Stella was seen at rDVM in February/March and was noted to have a slow heart rate. An echo with EKG done in March revealed mild MR and LAE along with 3rd degree AV block. She has a good appetite. The family has reduced her walks to half of what they were since Stella tends to tire easily. On exam today: bradycardic, grade II-III/VI murmur with PMI left apical area, PSS, lung fields clear. BP: 150mmHg x 5. Current medications: 1) Proin 50mg 1/2 tab twice a day 2) Cosequin 1/2 tab am with 1 tab pm 3) Vitachew twice a day *No sedation for study.
-Pertinent previous echo findings (3/25/22 Elizabeth Shaker, DVM, ACVIM): LA 2.3 cm; LA:Ao 1.3; LV 4.5 cm (no Doppler measurements available).

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 from an AliveCor monitor; 25mm/s, 10mm/mV. Complete AV block is present (3rd degree), with no P to QRS correlation. The sinus/P wave rate is 130bpm. The ventricular rate varies from 55bpm with a regular rhythm.
ECG diagnosis: Complete (3rd degree) AV block with a slow ventricular escape rhythm.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and Doppler imaging is available.
Left ventricle: The LV diameter is borderline increased with adequate myocardial function. LV wall thicknesses are normal 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. Mild eccentric mitral regurgitation. Diastolic MR is also appreciated.
Aortic valve/Aorta: The aortic valve is normal in morphology and mobility. Mildly elevated aortic outflow velocity; laminar flow. No aortic insufficiency.
Right ventricle: Mild RV dilation. No obvious RVH.
Right atrium: Mild RA dilation.
Tricuspid valve: The tricuspid valve appears normal with mild tricuspid regurgitation. Velocity consistent with mild pulmonary hypertension.
Pulmonic valve/Pulmonary artery: The pulmonic valve is normal in morphology and mobility. No pulmonic insufficiency. Mildly elevated RVOT velocity; laminar flow.
Pericardium/other: No pericardial or pleural effusion noted. No obvious cardiac masses.

2-Dimensional Measurements

Ao diam (cm)	1.8
LA diam (cm)	3.2
LA:Ao (Swe)	1.8
IVS thickness (cm)	0.8
LVID diastole (cm)	3.6
PW thickness (cm)	0.8
LVID systole (cm)	2.0
FS (%)	44

Doppler Measurements

PV Vmax (m/s)	1.8
AoV Vmax (m/s)	3.2
MR Vmax (m/s)	6.1
TR Vmax (m/s)	3.3
TR PG (mmHg)	44

INTERPRETATION OF THE FINDINGS

Complex or 3rd degree AV block persists with a ventricular rate of 55bpm. Significant bradycardia and AV block is usually an acutely progressive disorder, with most dogs requiring transvenous pacemaker implantation to relieve clinical signs such as collapse or

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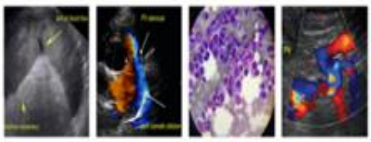

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lethargy. In an asymptomatic patient, continued monitoring would be one option; however, referral for pacemaker consideration should also be considered. The overall cardiac dimensions are increased compared to the prior study with moderate left atrial enlargement, this is likely secondary to chronic bradycardia. Only mild MR and TR are appreciated with mild pulmonary hypertension. Mildly elevated flow velocity through both great vessels is noted, which is secondary to bradycardia. No additional issues are identified at this time.

AV block is typically idiopathic in origin, with progressive deterioration of the electrical system resulting in persistent bradycardia, significant lethargy and collapse. An atropine challenge is recommended in any case of bradycardia (if not already performed), although the response is expected to be minimal. If there is any improvement in resting heart rate, stimulation through theophylline or propantheline (see below) can be attempted. Baseline full lab work should be performed, to rule out any electrolyte abnormalities that may be contributing. Additionally, baseline full body radiographs are recommended to rule out any neoplastic issues.

Barring any treatable systemic issues, the recommended treatment in this case is referral for discussion of pacemaker implantation. If declined, heart rate stimulation can be attempted as discussed; however, this is typically of limited benefit. That being said this patient is asymptomatic and potentially may remain that way for some time. If not corrected, this patient will succumb to either continued cardiac dilation resulting in CHF (which will be difficult to manage in the absence of a normal heart rate), or to worsening bradycardia/syncope/sudden death. The goal would be to stabilize the situation through heart rate management and use medical support to hopefully support the structural disease.

With this degree of left atrial enlargement, there is some risk for spontaneous congestive heart failure in the future and cardiac supportive Pimobendan is recommended as below. Unfortunately, the patient will always be at risk for recurrent CHF, development of arrhythmias, syncope and/or sudden death in the future.

RECOMMENDATIONS

- Recommend referral to a local Cardiologist if a pacemaker would be a possibility.
- Screening lab work and radiographs if not already performed.
- Consider Atropine challenge (if not already performed) and if referral is declined. Administer 0.04mg/kg atropine IV and reassess ECG for 5-10 minutes post-injection.
- If there is any improvement with atropine, can attempt Theophylline 10mg/kg PO q12h.
- If this is ineffective, can attempt HR stimulation with propantheline bromide (difficult to find typically).
- Institute Pimobendan 0.25-0.3mg/kg PO q12h.
- Consider humane euthanasia if lethargy/syncope develops and affects QOL and/or CHF develops.
- Close monitoring for development of associated clinical signs (development of a cough, labored breathing, exercise intolerance or worsening collapse episodes) is recommended. Monitoring of sleeping breathing rates is recommended as the best way to screen for CHF at home.
- Activity restriction is advised.

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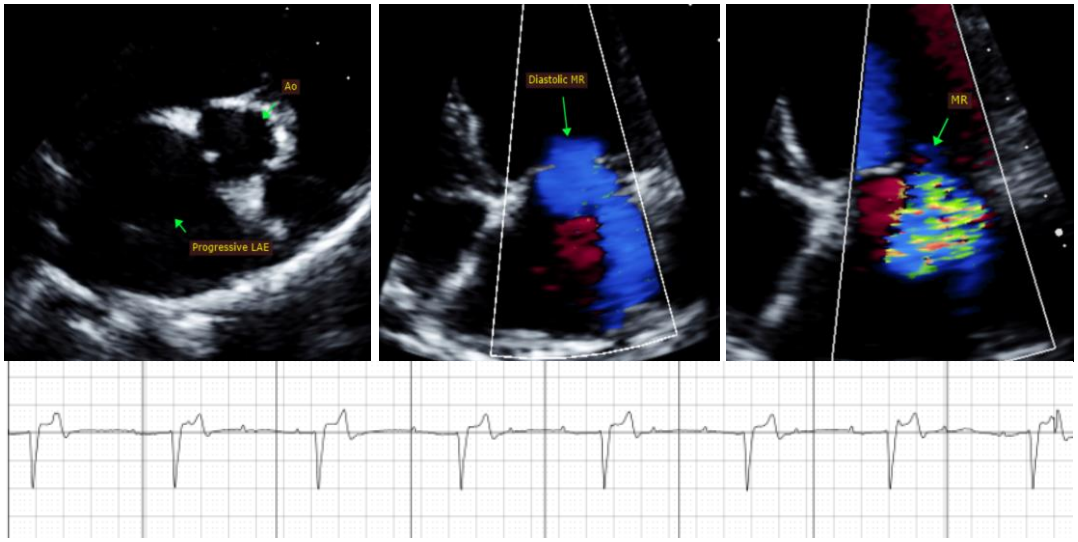
- Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.
- Anesthesia should be avoided at all costs.

PLAN

- 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)