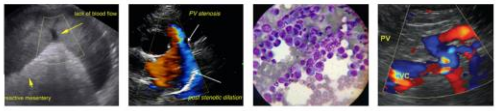
Mass Veterinary Specialty Services
1-413-734-1292



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

PATIENT

Toby Edson

SPECIES

Canine

BREED

Hound Mix

SEX

Male Neutered

AGE

7 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

20566

DATE

8/17/21

PRESENTING CLINICAL SIGNS

History: Toby was noted to have a heart murmur in July. A ProBNP revealed a marked increase at 3230. He also had a collapse/seizure-type episode noted in July with possibly a second episode a week later. He has not had any further instances, but the family has been restricting his activity. Good appetite. CV/RESP: arrhythmia noted with skipped beats, grade IV/V murmur with PMI left apical area radiating to right, PSS, lung fields clear. BP: 180-190mmHg. No medications. *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 from an AliveCor monitor; 25mm/s, 10mm/mV. Complete (3rd degree) AV block is present; however, intermittent AV nodal conduction is suspected (high grade 2nd degree block). The sinus/P wave rate is 115-136bpm. The ventricular rate varies from 43-65bpm depending on AV nodal conduction.
ECG diagnosis: High grade 2nd degree AV block with periods of complete AV block.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and Doppler imaging is available.
Left ventricle: The LV diameter is 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 diastolic mitral regurgitation**.**
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 no tricuspid regurgitation.
Pulmonic 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

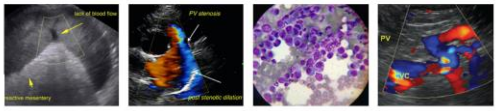
Ao diam (cm)	2.1
LA diam (cm)	3.3
LA:Ao (Swe)	1.6
IVS thickness (cm)	0.85
LVID diastole (cm)	4.7
PW thickness (cm)	0.81
LVID systole (cm)	2.8
FS (%)	40

Doppler Measurements

PV Vmax (m/s)	1.0
AoV Vmax (m/s)	2.2
MR Vmax (m/s)	NM
TR Vmax (m/s)	NA
TR PG (mmHg)	NA

INTERPRETATION OF THE FINDINGS

The rhythm diagnosis is high grade 2nd and 3rd degree AV block with a ventricular rate of 45-60bpm. There does appear to be some AV nodal conduction present; however,



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regardless this is reflective of high-grade pathologic AV block. 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 lethargy. In a collapsing patient, immediate referral should certainly be considered for discussion of medical and surgical options. The overall cardiac dimensions are increased with is likely secondary to chronic bradycardia. Additionally, the murmur is due to increased aortic outflow velocity, which is likely secondary to prolonged diastolic filling periods. 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, 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

- Highly recommend immediate referral to a local Cardiologist.
- Screening lab work and radiographs.
- Consider Atropine challenge 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 persists and affects QOL and/or CHF develops.

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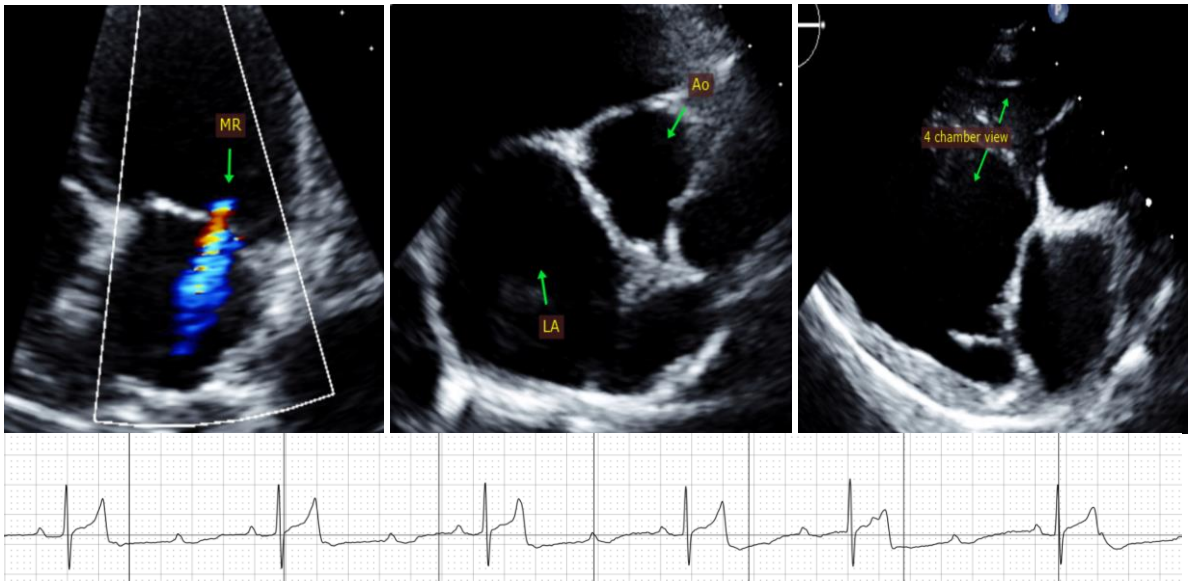
- Close monitoring for development of associated clinical signs (development of a cough, labored breathing, exercise intolerance or worsening collapse episodes) is recommended. Monitoring of sleeping breathing rates is recommended as the best way to screen for CHF at home.
- Activity restriction is advised.
- Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.

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)