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Pet Animal Ultrasound Service
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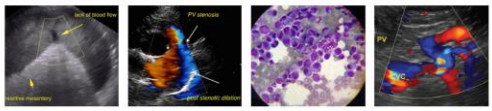

SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
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**PATIENT**
Marilyn Boisvert

**SPECIES**
Canine

**BREED**
Weimaraner

**SEX**
Female Spayed

**AGE**
7.5 years

**WEIGHT**
67lbs

**INTERPRETED BY**
Maggie Machen Lamy, DVM DACVIM (Cardiology)

**IMAGING PERFORMED BY**
Pamela Harrigan, RDCS

**HOSPITAL NAME**
VCA Hansen Animal Hospital

**REFERRING VET**
Dr. Whalen

**INVOICE**
30132

**DATE**
4/10/23

## PRESENTING CLINICAL SIGNS

History: History of ulcerative blepharitis (well managed on topical neo/poly/dex ophth ointment and Cyclosporine 100 mg PO SAI). At last exam and at onset of treatment for ocular disease, noted to be bradycardic, 40-50bpm. Also noted Grade II/VI murmur at most recent exam 2 weeks ago. Was on grain free diet- recommended to stop his and switch to grain inclusive. No reports of collapse, fainting, stumbling, or lethargy. Current meds: Cyclosporine 100mg PO SID, Topical neo/poly/dex IU BID (for ulcerative/immune blepharitis).

## 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. The majority of the tracing shows nonconductive P waves with a slow ventricular escape rate (heart rate: 40bpm). Occasional AV nodal conduction is seen with an appropriate PR interval and up-right sinus beat. The AV block appears high grade with >10:1 conduction. ECG diagnosis: High grade 2nd 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 normal with adequate myocardial function. LV wall thicknesses are normal with increased sphericity.
**Left atrium:** The left atrium is normal.
**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:** No significant RV dilation.
**Right atrium:** No RA dilation.
**Tricuspid valve:** The tricuspid valve appears normal with mild diastolic 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**

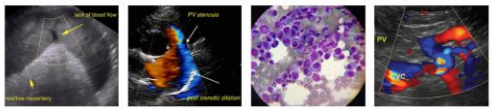
| | |
|---|---|
| Ao diam (cm) | 2.4 |
| LA diam (cm) | 2.4 |
| LA:Ao (Swe) | 1.0 |
| IVS thickness (cm) | 1.0 |
| LVID diastole (cm) | 4.4 |
| PW thickness (cm) | 1.0 |
| LVID systole (cm) | 2.2 |
| FS (%) | 50 |

**Doppler Measurements**

| | |
|---|---|
| PV Vmax (m/s) | 1.3 |
| AoV Vmax (m/s) | 2.7 |
| MR Vmax (m/s) | NA |
| TR Vmax (m/s) | NA |
| TR PG (mmHg) | NA |

## INTERPRETATION OF THE FINDINGS

The rhythm diagnosis is high grade 2nd degree AV block with a ventricular rate of 40bpm. There is some AV nodal conduction present; however, 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. **Any patient with a heart rate of 40bpm**





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**warrants immediate referral if pacemaker implantation may be an option.** The overall cardiac dimensions are adequate with mild changes secondary to bradycardia. Additionally, the murmur is benign due to increased flow velocity through the aortic root, also 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, 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.

Given a lack of significant cardiac chamber enlargement, no obvious indication for supportive medications at this time. 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 referral to a local Cardiologist to discuss possible pacemaker implantation.
- 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).
- Consider humane euthanasia if lethargy/syncope develops, affects QOL and/or CHF is identified.
- 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.

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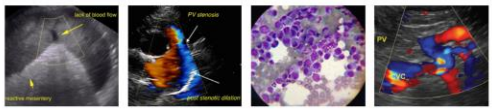

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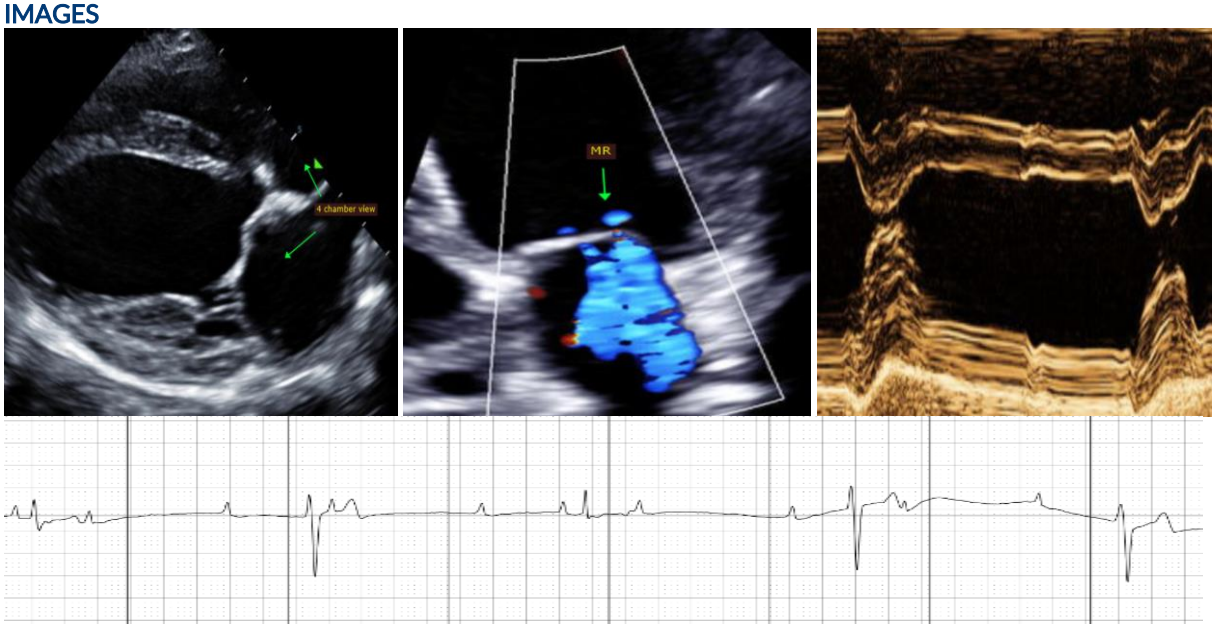
## PLAN

- 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)