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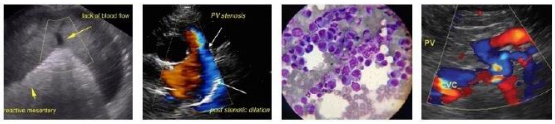

THE FOCAL ZONE
IMAGING PERFORMED BY
289-808-2608 info@thefocalzone.com

**PATIENT**
Gemma Racz-Thorn

**SPECIES**
Canine

**BREED**
Boxer

**SEX**
Female Spayed

**AGE**
9 years

**WEIGHT**
66.1lbs

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

**IMAGING PERFORMED BY**
Crystal Hill, RVT

**HOSPITAL NAME**
Wellington Animal Hospital

**REFERRING VET**
Dr. Dennis

**INVOICE**
24540

**DATE**
6/2/22

## PRESENTING CLINICAL SIGNS

History: Was admitted for GA and lump removal but noted a cardiac arrythmia and cancelled procedure. Ideally needs to undergo GA for large lump on elbow. No current meds. Previously low protein on bloodwork and otherwise bloodwork normal.

## 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, 20mm/mV. The average heart rate is 120bpm (range 71-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. Frequent isolated VPCs throughout; monomorphic. A single APC is identified. No additional dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with frequent isolated VPCs and rare APCs.

## ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The mitral valve appears normal in form and function, with no obvious prolapse into the left atrial lumen. No MR seen. Normal left atrial dimension. Normal LV diameter with adequate myocardial function. Normal LV wall thickness. The tricuspid valve appears normal in form and function. No overt evidence of pulmonary arterial hypertension or right heart compensation, however right heart is prominent. No tricuspid regurgitation. The aortic valve is normal in morphology and mobility. No subvalvular ridge present, mildly increased velocity. No aortic insufficiency. Normal pulmonic valve with no pulmonic insufficiency seen. No pericardial or pleural effusion noted. No obvious cardiac tumors. Irregular rhythm noted throughout the examination.

## CARDIAC CHART

| CANINE CARDIAC PARAMETERS | MR VMAX (m/s) | TR VMAX (m/s) | LA/AO (Boon method) | LA/AO (Heart Base; Swe) | FS (%) | EF (%) | EPSS (cm) |
|---|---|---|---|---|---|---|---|
| NORMAL PARAMETER | 4.5-5.5 | <2.7 | 1.3 | <1.6 | 28-40 | 40-100 | <0.6 |
| PATIENT | | | 1.2 | 1.4 | 30 | 58 | 0.6 |
| **CANINE CARDIAC PARAMETERS** | **HR** (BPM) | **AV VMAX** (m/s) | **PV MAX** (m/s) | **BODY WEIGHT** (kg) | **LA** 2D short axis Base view (cm) | **LVIDd** Avg; 2D and m-mode short axis (cm) | **LVIDs** Avg; 2D and m-mode short axis (cm) |
| NORMAL PARAMETER | 50-100 | 0.7-1.7 | 0.7-1.6 | BELOW | BELOW | BELOW | BELOW |
| PATIENT | 142 | 1.8 | 1.5 | 30.0 | 3.0 | 4.3 | 3.0 |
| *Normal chamber parameters expressed as a mean value (SD) | | | | 3 | 1.27 (5.3) | 2.46 (2.46) | 1.36 (5.5) |
| **BODY WEIGHT DEPENDENT PARAMETERS** | | | | 5 | 1.40 (4.5) | 2.74 (5.2) | 1.60 (4.7) |
| **Note: All measurements based upon multi-modal images and methods. An average value is reported.* | | | | 10 | 1.50 (3.8) | 3.27 (3.5) | 2.06 (3.1) |
| | | | | 15 | 1.83 (2.0) | 3.71 (2.4) | 2.43 (2.1) |
| | | | | 20 | 2.02 (1.9) | 4.14 (2.2) | 2.80 (2.0) |
| Adapted from June Boon, Veterinary Echocardiography, 1998 | | | | 25 | 2.18 (2.4) | 4.48 (2.9) | 3.10 (2.5) |
| Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435 | | | | 30 | 2.33 (3.3) | 4.83 (3.9) | 3.39 (3.4) |
| Hansson et al, Vet Rad and Ultrasound 2002 | | | | 35 | 2.48 (4.3) | 5.17 (5.0) | 3.69 (4.5) |
| Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995 | | | | 40 | 2.62 (5.2) | 5.48 (6.1) | 3.96 (5.4) |
| | | | | 50 | 2.88 (7.1) | 6.07 (8.3) | 4.46 (7.4) |

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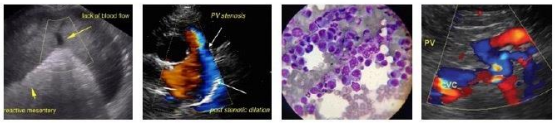

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## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The cardiac structure and function are essentially normal in this patient. There is mild right heart prominence in some views, however this is angle dependent and may be a normal variant. The left heart dimensions are normal, and the systolic function considered adequate for a large breed dog (FS 28-32%). No valvular insufficiencies were noted, and no structural issues identified.

Frequent ventricular premature contractions were however confirmed as the cause of the noted arrhythmia. VPCs are generated from abnormal conductive or fibrotic tissue in the ventricles of the heart muscle, and even frequent single VPCs will often cause no clinical signs in dogs. When sustained however, ventricular tachycardia can lead to symptoms such as lethargy and collapse.

VPCs are a very non-specific finding. They can be primary in origin (such as ARVC), be secondary to significant cardiac disease (not present in this study) or be extra-cardiac in origin; i.e., due to pain, stress, inflammation, cancer, GI disease, DIC/sepsis, etc. In a 9yo Boxer, there is high suspicion for ARVC (most common age of onset 6-8yo, often asymptomatic). ARVC can occur with or without systolic dysfunction and structural issues, however this should be monitored going forward for any progressive issues. It is always reasonable to rule out other differentials for VPCs (AUS, tick titers, troponin, etc.) however suspicion is low given the signalment of the patient. Unfortunately, there is always an elevated risk for collapse and sudden death in any arrhythmic patient, and even on medications this risk unfortunately still persists. ARVC carries a HIGHLY variable prognosis, with some dogs able to remain asymptomatic for extended periods of time, and others developing exercise intolerance, syncopal episode, and refractory arrhythmias/sudden death imminently.

Anti-arrhythmic therapy is warranted as below. This is based upon the frequency of VPCs and a high risk for sudden death. Once sotalol is on board, an extended time 6 lead ECG and/or **holter monitor** is a reasonable next step to allow monitoring of the rhythm throughout 24 hours of a normal day to ensure good rhythm control.

Fish oil supplementation is recommended for dogs with arrhythmias (1000mg of omega 3 and 6 once to twice daily as tolerated).

Once the arrythmia is controlled, anesthetic risk is considered moderate. Avoid ketamine, telazol, Dexdomitor (or other alpha-2 agonists) and acepromazine. Recommend having lidocaine CRI available for use in the event of worsening ventricular arrhythmias under anesthesia (CRI 50—75mcg/kg/min).

Monitor at home for collapse, exercise intolerance, and/or lethargy. Anesthesia is not recommended until good arrhythmic control is achieved. Lifelong mild to moderate activity restriction is advised.

## PLAN

Institute sotalol 80mg tablets, give ½ tab PO q12h. Recheck ECG in 1-2 weeks to assess response (goal is significant reduction in ectopy without a significant change in underlying sinus rate). Consider holter at this time if desired.

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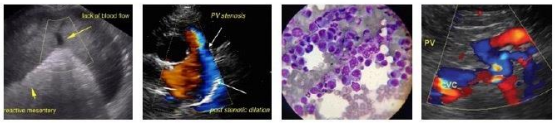

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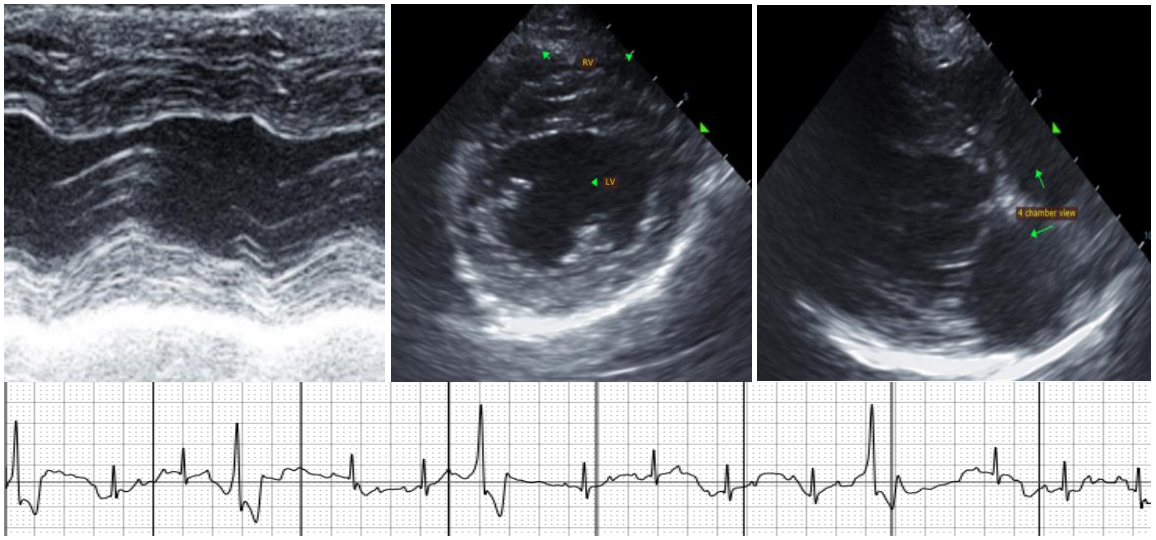
Recheck ECG and echocardiogram is recommended in 6 months to determine progression/control, sooner if any development of associated clinical signs.

## 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