



**PATIENT**

Otis Baradi

**PRESENTING CLINICAL SIGNS**

History: Grade IV/VI systolic murmur. Two recent syncopal episodes when running outside. Recovers quickly. BP: 135-155mmHg.

**SPECIES**

Canine

**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. The average heart rate is 120bpm (range 107-125bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. P and QRS morphologies are positive. Isolated APCs are identified; singles only. No VPCs, pauses or other dysrhythmias observed. ECG diagnosis: Normal sinus rhythm with isolated APCs.

**BREED**

Aussie mix

**SEX**

Male Neutered

**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and Doppler imaging is available.

**Left ventricle:** Significant LV dilation with hyperdynamic myocardial function. Increased sphericity.

**Left atrium:** The left atrium is severely dilated.

**Mitral valve:** Diffuse thickening of mitral valve leaflets with mild prolapse into the left atrial lumen. Severe eccentric mitral regurgitation with a normal velocity.

**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 enlarged with mild hypertrophy. Adult heartworms appreciated in the infundibular region of the RVOT.

**Right atrium:** Moderately right atrial dilation.

**Tricuspid valve:** The tricuspid valve appears mildly thickened, with moderate tricuspid regurgitation. Mildly elevated velocity consistent with mild pulmonary hypertension.

**Pulmonic valve/Pulmonary artery:** The pulmonic valve is normal in morphology and mobility. The MPA and branches are markedly dilated. Large volume of worms seen, primarily located just proximal to the bifurcation. At least 1 worm can be seen associated with the pulmonic valve apparatus traversing the valve in systole. Normal pulmonic outflow velocities with laminar flow. Moderate PI.

**Pericardium/other:** No pericardial or pleural effusion noted. No obvious cardiac masses.

**AGE**

7 years

**WEIGHT**

47.8lbs

**INTERPRETED BY**

Maggie Machen  
Lamy, DVM  
DACVIM (Cardiology)

**IMAGING PERFORMED BY**

Eduardo Rodriguez  
III, RCS

**HOSPITAL NAME**

Mendon Animal Clinic

**REFERRING VET**

Dr. Cervasio

**INVOICE**

29821

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3/24/23

**2-Dimensional Measurements**

Ao diam (cm)	2.3
LA diam (cm)	4.6
LA:Ao (Swe)	2.0
IVS thickness (cm)	1.0
LVID diastole (cm)	5.7
PW thickness (cm)	0.9
LVID systole (cm)	3.3
FS (%)	43

**Doppler Measurements**

PV Vmax (m/s)	1.5
AoV Vmax (m/s)	1.7
MR Vmax (m/s)	4.7
TR Vmax (m/s)	2.9
TR PG (mmHg)	34

**INTERPRETATION OF THE FINDINGS**

The cause of the murmur is chronic degenerative valve disease causing severe mitral and moderate tricuspid regurgitation. Severe left atrial enlargement indicates the risk for spontaneous congestive heart failure is elevated. Mild pulmonary hypertension is described by the TR velocity; however, this is suspected to be an underestimation. The



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MPA and branches are markedly dilated with a heavy heartworm infestation present, putting the patient at additional risk for complication. No additional issues are identified.

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The ECG is largely normal with isolated APCs. These are no doubt secondary to severe structural disease and stress in this patient. No treatment is warranted at this time.

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Aussie mix

Heartworms if left untreated can cause significant damage to the lung tissue leading to pulmonary damage, pulmonary hypertension and clinical signs such as coughing, decreased ability to exercise, or difficulty breathing. Disease severity can range from an asymptomatic dog with few worms to dogs with severe respiratory signs. In the most severe cases, caval syndrome may develop due to a very high worm burden sheering blood cells as they pass through the heart. Caval syndrome is a life-threatening emergency that requires immediate surgical removal of the worms.

**AGE**

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It is surprising that the patient has only recently developed syncope and no cough is described. This patient is at extremely high risk for cava syndrome, acute worm embolus and sudden death and this should be expressed to the owner. Medical management with Sildenafil and Pimobendan should be utilized as below, including full cardiac support for concurrent left-sided disease. Even without respiratory signs, low-dose Lasix and Spironolactone are recommended due to extremely high risk in this case.

**WEIGHT**

47.8lbs

Given a high worm burden, there **is indication for extraction in this case**. Immediate referral to a local Cardiologist should be recommended if the owner is interested in pursuing this option. If declined, utilize medications and the standard approach to heartworm treatment as dictated by the American Heartworm Society is recommended, including 30 days of doxycycline and heartguard prior to the split immiticide protocol. Please see website and protocol for specific information. There is extremely high risk for thromboembolism in any patient; however, those with adult worms seen in the PA are no question at elevated risk. At this time, exercise restriction is paramount, including cage rest with leash walks only, as a worm embolus can be a life-threatening complication of the disease. This should be continued for an additional 6-8 weeks following therapy.

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Modifications to this protocol are sometimes elected depending on individual circumstances which may involve fewer injections or a "slow kill" method. These are not; however, our standard recommendation as alternate treatment may not result in effective treatment of the infestation.

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Following treatment, retest for heartworm disease 6 months after completing the full course of therapy. Anesthesia is NOT advised prior to completing the protocol, as vasodilation can lead to increased risk for an embolus. Prognosis is guarded to poor in this case, as the right heart/MPA changes are often permanent and may cause clinical signs (exertional syncope/dyspnea, right-sided CHF) in the future. Additionally the left-sided disease is considered end-stage as well.

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During therapy, there is high risk for a worm embolus and breathing rate and effort should be monitored closely. Patient will be at high risk for developing clinical signs due to pulmonary hypertension with age given the inherent secondary inflammation and damage to the pulmonary vasculature and lungs, and periodic rechecks may be helpful.



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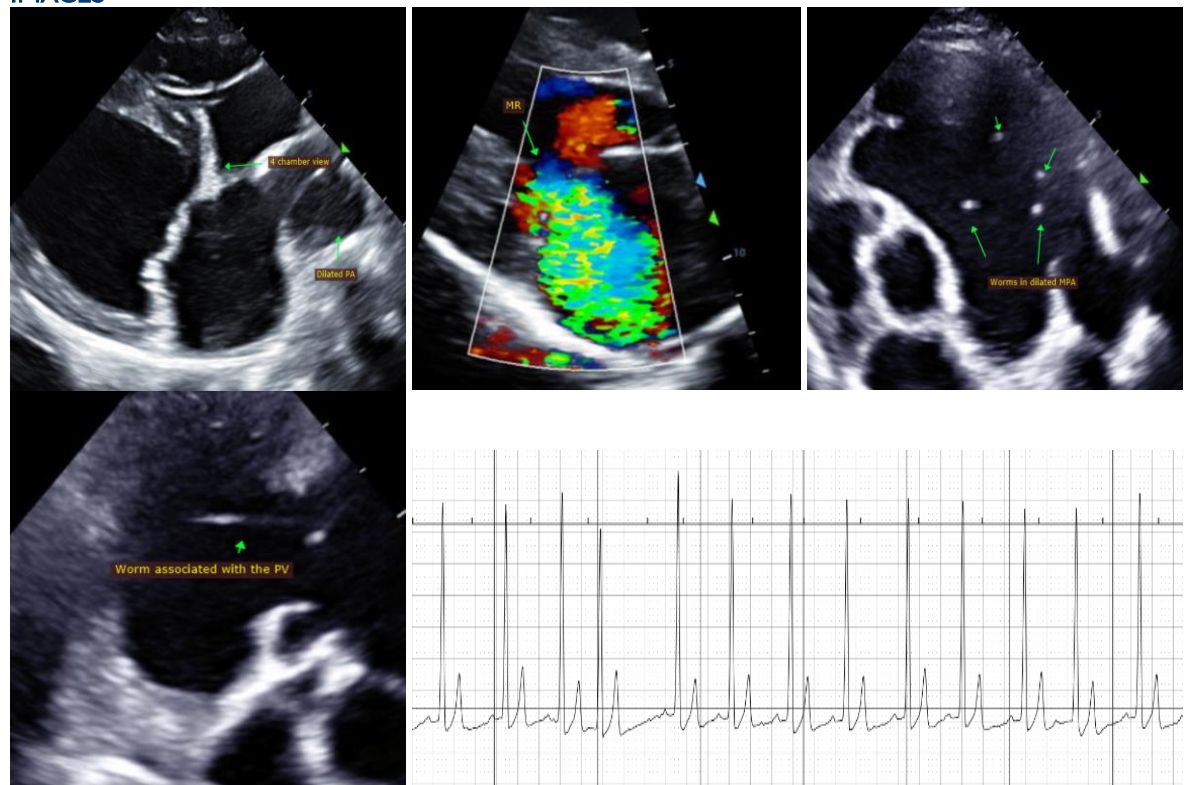
**RECOMMENDATIONS**

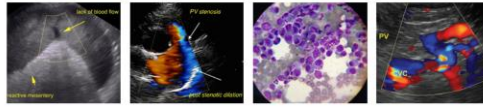
- Consider immediate referral for worm extraction if elected.
- Institute Doxycycline and Ivermectin as prescribe in preparation for the split protocol.
- Institute Lasix 1mg/kg PO q12h.
- Institute Spironolactone 1mg/kg PO q 12h.
- Institute Pimobendan 0.25-0.3 mg/kg PO q12h.
- Institute Sildenafil 1-2mg/kg PO q8h.
- Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes.
- Strict activity restriction is indicated.
- Monitor for exertional dyspnea or fainting episodes going forward.

**PLAN**

- If referral is declined, renal values and a BP are recommended in 1-2 weeks then every 3-4 months life.
- A recheck of echocardiogram and chest radiographs are recommended in 6 months to reassess pulmonary/right heart changes.

**IMAGES**





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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.

**SPECIES**

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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.

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Aussie mix

Maggie Machen Lamy, DVM  
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)  
info@sonopath.com

**SEX**

Male Neutered

Echocardiogram performed by: Pamela Harrigan, RDCS  
Pet Animal Ultrasound Service ([4paus.com](http://4paus.com))

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