

**PATIENT**

Perry SHHS

**SPECIES**

Canine

**BREED**

Labrador Mix

**SEX**

Male Neutered

**AGE**

5 years

**WEIGHT**

68lbs

**INTERPRETED BY**

Maggie Machen  
 Lamy, DVM, DACVIM  
 (Cardiology)

**IMAGING PERFORMED BY**

Sara Hansen

**HOSPITAL NAME**

Safe Haven Humane  
 Society

**REFERRING VET**

Dr. Corriher

**INVOICE**

25431

**DATE**

7/19/22

**PRESENTING CLINICAL SIGNS**

History: Transport dog that was treated for heartworms at the source shelter: - 3/10/22- IDEXX SNAP test HW positive - 4/5-4/6/22- Received two Immiticide injections 1 day apart - 5/21/22- Witness test HW negative - Dog became symptomatic while in our care, coughing, muffled heart sounds - 7/5/22- IDEXX SNAP test HW positive, IDEXX microfilariae test negative - 7/7/22- restarted AHS HW treatment protocol  
 -Current Medications Prednisone, Doxycycline, HW prevention (AHS HW Tx protocol).

**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; 50mm/s, 10mm/mV. The average heart rate is 90bpm (range 46-136bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. No ectopic beats, pauses or dysrhythmias observed.  
 ECG diagnosis: Sinus bradycardia with respiratory variation.

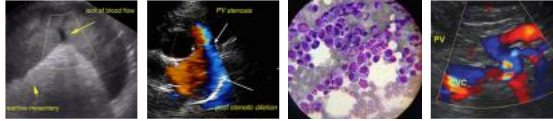
**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and doppler imaging is available. Mild mitral valve thickening with no obvious prolapse into the left atrial lumen. Trace/mild central mitral regurgitation. Normal left atrial dimension. Normal LV diameter with adequate myocardial function. Normal LV wall thickness. The tricuspid valve appears normal in form and function with no TR. Mild right heart prominence. The pulmonic and aortic valves are normal in morphology and mobility. Normal LVOT and RVOT velocity. No aortic and trace pulmonic insufficiency. Mild MPA prominence; no obvious adult worms seen in main body or distal branches. No pericardial or pleural effusion noted. No obvious cardiac tumors seen.

**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	NM	NA	1.4	1.2	38	69	0.7
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	NM	1.7	0.84	30.8	2.6	4.6	2.8
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
<b>BODY WEIGHT DEPENDENT PARAMETERS</b>				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)
				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)
				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)

Adapted from June Boon, Veterinary Echocardiography, 1998  
 Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435  
 Hansson et al, Vet Rad and Ultrasound 2002



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Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995	30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
	35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
	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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**INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

Overtly normal cardiac structure and function documented in this study. A small mitral leak is noted, which may reflect early valve disease or may be physiologic in origin. Follow up is advised. Finally, no adult worms are seen in the MPA or right heart at this time. It is important to note that ultrasound is not 100% sensitive for finding adult worms and presence in peripheral locations is still a possibility.

The cough is likely due to pulmonary damage/inflammation and treatment should be based upon clinical signs. This includes anti-inflammatory Prednisone, Hydrocodone, etc.

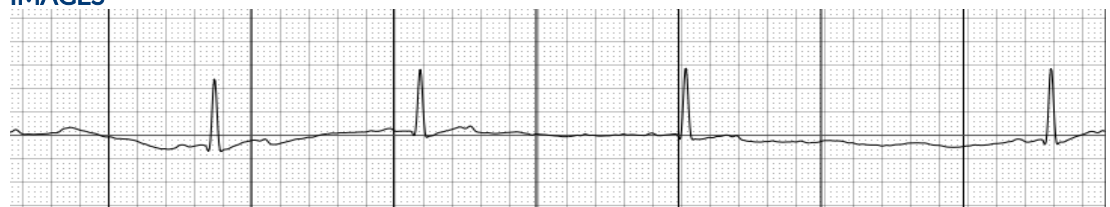
There is no obvious contraindication for Immiticide therapy with a presumably low adult worm burden. That being said, the history is odd that the patient was negative shortly after IMmiticide therapy then positive again. Certainly confirming the diagnosis is recommended through ancillary testing. HW status is typically reassessed 6 months after therapy as a sooner positive result can be over-interpreted. If confirmed that the prior treatment failed, recommended proceed as dictated by the American Heartworm Society ([www.heartwormsociety.org](http://www.heartwormsociety.org)), including 30 days of doxycycline and monthly Ivermectin. Strict cage rest required at least until 4-6 weeks following the final treatment.

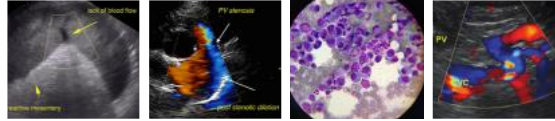
If treatment is successful, good chance for no long-term issues associated with HW disease (cough, pulmonary hypertension, pulmonary damage, etc.) given a normal cardiac structure and lack of clinical signs.

The ECG is most consistent with high vagal tone, which is not unexpected in a coughing dog. Other contributing causes for high vagal tone can be investigated including GI, neurologic disease, etc. An alternative explanation would be sinus node dysfunction, although the former is suspected in this dog. If the heart rate does not stimulate appropriately with exercise/stress, consider an atropine challenge (0.04mg/kg IV or IM). If the rate does not stimulate appropriately, consider a holter monitor as the next step in evaluation.

Follow up echocardiography is recommended 1 year following adulticide therapy, sooner if clinical signs of cardiac disease develop (murmur, fainting, etc.).

**IMAGES**





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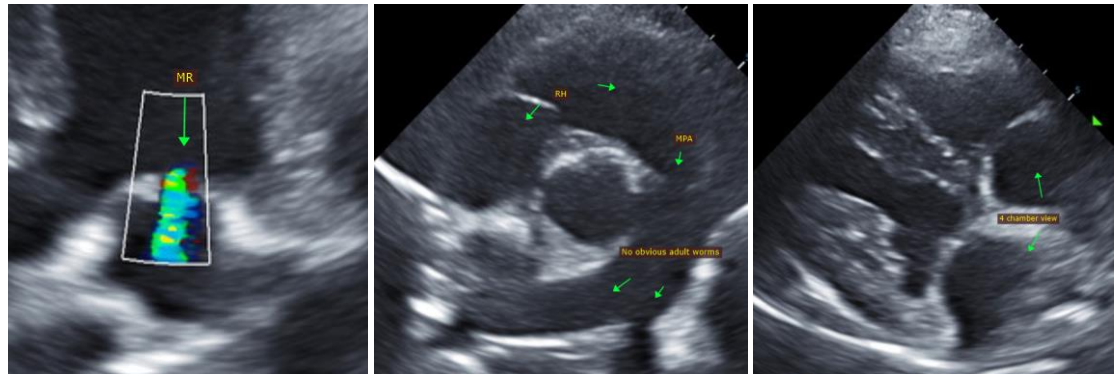
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The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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)  
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