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Clinical Sonography & Telecytology
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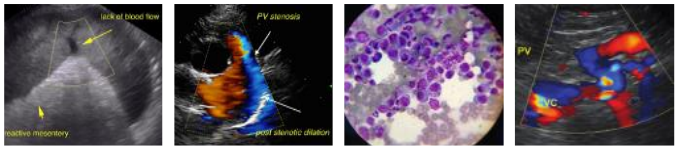

SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT
Lucy Stanek

SPECIES
Canine

BREED
Lab

SEX
Female Intact

AGE
4 years

WEIGHT
74lbs

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

IMAGING PERFORMED BY
A. Nicastro, DVM

HOSPITAL NAME
Trinity Island Veterinary Clinic

REFERRING VET
Dr. Oldham

INVOICE
30014

DATE
4/4/23

PRESENTING CLINICAL SIGNS

History: Heartworm positive since adopted. Has tried slow kill - Heartgard q2weeks for 6 months and Advantage Multi q2weeks for 6 months (but dog does swim). Also, multiple rounds of Doxycycline. Still HW +. Owner cannot keep dog still enough to do Immiticide.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve with no prolapse into the left atrial lumen. Trace MR; normal LA dimension. No LV dilation with adequate myocardial function. The MPA and branches are minimally dilated. Concern for adult worm near the level of the bifurcation (see below). The distal pulmonary branches cannot be visualized. No worms seen in the RA or RV. No right atrial dilation. RV appears normal with no obvious RVH. No tricuspid regurgitation. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No aortic or pulmonic insufficiency. No pericardial or pleural effusion.

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	NA	NA	NM	1.2	28	50	NM
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	0.9	33.6	2.9	5.1	3.6
*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)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Overtly normal cardiac dimensions and function. Suspicion for a single adult heartworm near the PA bifurcation. The distal branches cannot be visualized, and further infiltration is not ruled out. This is not definitive as ultrasound is largely insensitive (i.e., adult worms may be easily either missed peripherally or elsewhere, and artifact can be misinterpreted). Given a lack of right heart enlargement or clinical signs however, the infestation is considered relatively mild without evidence of pulmonary hypertension or respiratory signs. No cardiac specific treatment is warranted in an asymptomatic patient. No additional issues are identified.

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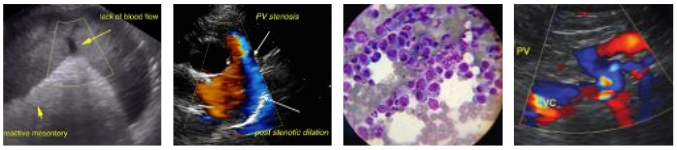

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Heartworms can cause significant damage to the lung tissue leading to pulmonary damage, pulmonary hypertension and clinical signs such as coughing, decreased ability to exercise, or difficulty breathing. Disease severity can range from an asymptomatic 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.

Given what is seen here, consider referral for extraction if desired. Otherwise, recommendations should be dictated by the American Heartworm Society. Immiticide is likely the best option in this patient if possible, although as mentioned cage rest will be difficult. If slow kill is elected, a **heartworm negative status would not be expected in only 6 months** as this can take far longer to resolve the infestation (up to 3 years). If elected despite the recommendation for Immiticide, continued therapy with monthly Heartguard would be recommended long term, reassessing the HW status in another 6-9 months.

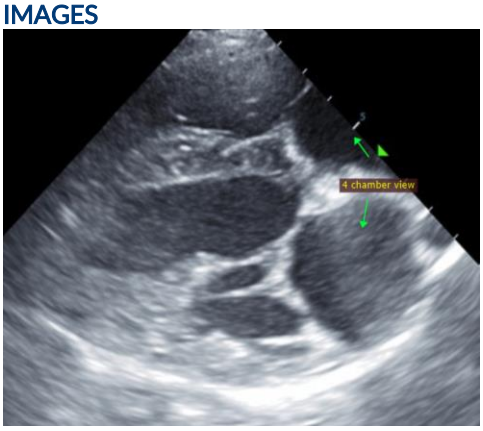
There is high risk for thromboembolism in any patient; however, those with adult worms seen in the PA are no question at elevated risk. At this time, exercise restriction is paramount, including cage rest with leash walks only, as a worm embolus can be a life-threatening complication of the disease.

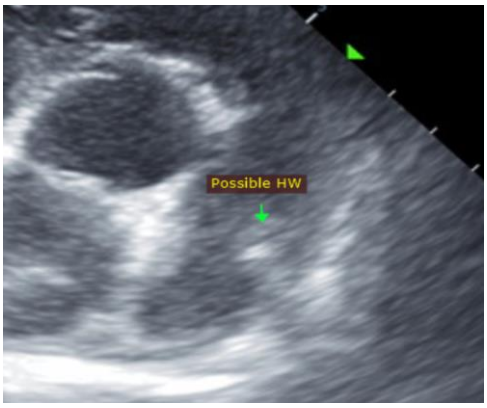
Anesthesia is NOT advised prior to achieving a HW negative status, as vasodilation can lead to increased risk for an embolus. Prognosis is guarded, although an asymptomatic patient without secondary cardiac remodeling is a good sign.

During therapy, there is high risk for a worm embolus and breathing rate and effort should be monitored closely. Anti-inflammatory prednisone can be used if becomes symptomatic. 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. Monitor for exertional dyspnea or fainting episodes going forward.

Plan: Consider referral, immiticide if able/elected. Otherwise continue slow kill method utilizing monthly heartguard and reassess HW status every 6-9 months.

IMAGES





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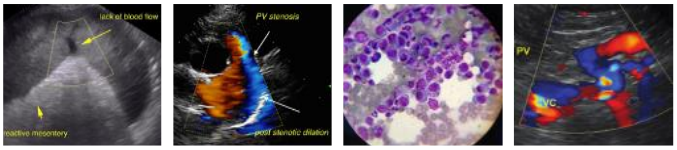

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The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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)
info@sonopath.com