



**PATIENT**

Heidi Zimmerman

**SPECIES**

Canine

**BREED**

Lhasa Apso

**SEX**

Female Spayed

**AGE**

16 years

**WEIGHT**

24lbs

**INTERPRETED BY**

Maggie Machen Lamy,  
DVM, DACVIM  
(Cardiology)

**IMAGING PERFORMED BY**

Kelly Romero, DVM

**HOSPITAL NAME**

Worthington Animal  
Clinic

**REFERRING VET**

Dr. Blain

**INVOICE**

47418

**DATE**

4/3/26

**PRESENTING CLINICAL SIGNS**

History: Cough. Has been treated for tracheal collapse for the last year with Prednisone. No murmur, but difficult to auscultate - somewhat muffled. BP: 114mmHg. Started on Sildenafil and Doxycycline.

**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and doppler imaging is available. Mild diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. No mitral regurgitation with no left atrial dilation. Normal LV diameter with hyperdynamic myocardial function. The tricuspid valve appears mildly thickened with no tricuspid regurgitation. Mild right heart enlargement. MPA and branches are mildly dilated. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No obvious aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No obvious cardiac masses.

**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	1.3	1.3	60	90	0.2
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	1.1	1.1	10.9	1.6	2.7	1.0
*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)
<i>*Note: All measurements based upon multi-modal images and methods. An average value is reported.</i>				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)
				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)

**INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

The only abnormality identified is suspicion for mild to moderate pulmonary hypertension (PAH). This is based upon right heart/MPA enlargement in a coughing dog. The left heart is normal, and no additional issues are identified.

The underlying genesis of PAH is poorly understood in cases other than heartworm infestation, though it occurs with increased frequency in a variety of forms of airway disease and in patients with idiopathic pulmonary fibrosis. In a Yorkie with respiratory disease, this is likely the



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underlying issue. Clinical signs of weakness, heavy breathing, and syncope are attributed to severe PAH, and may develop in the future.

Given the history and echocardiogram findings, this patient has airway disease that over time has begun to affect the heart (PAH) creating early pressure elevation. In other words, the cough is non-cardiac in origin; however, PAH may be developing secondary to it. It is important to note the PAH is considered early given only mild changes and does not necessarily warrant therapy at this time as there is no known benefit to Sildenafil prior to associated clinical signs such as syncope. That being said, a trial is benign and may be used to assess patient response.

Recommend continued airway workup and/or treatment (i.e., TTW, BAL and/or broad-spectrum pulmonary antibiotics such as Baytril, aggressive Hydrocodone, theophylline, etc.). Omega fatty acid supplementation may be of some long-term benefit.

No cardiac contraindication for general anesthesia. Pre-oxygenating for 5-10 minutes is recommended prior to induction.

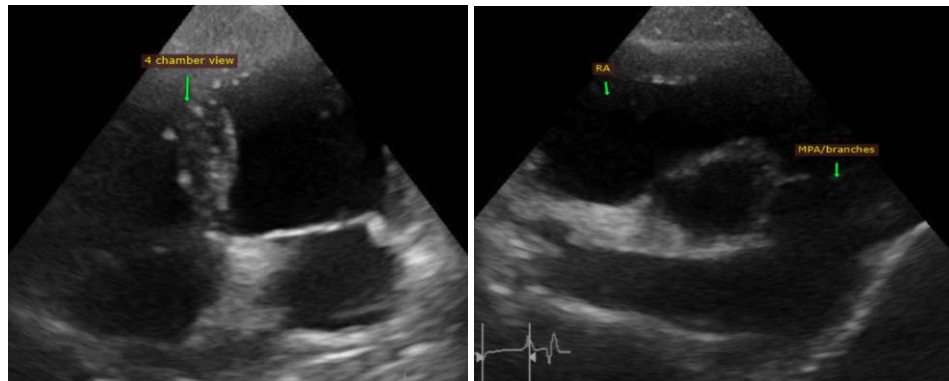
Monitor for development of a labored breathing, worsening cough, exercise intolerance or collapse episodes in the future.

## PLAN

Consider further airway work up/treatment as discussed. If elected, a trial of Sildenafil can be instituted 1-2mg/kg PO q8h for 2 weeks and assess response (a positive response being improved breathing comfort, decreased exertional cyanosis).

Recommend recheck echocardiogram in 6-12 months to screen for progression, sooner if any associated clinical signs are noted.

## 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.



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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.

**Maggie Machen Lamy, DVM**

**Diplomate of the American College of Veterinary Internal Medicine (Cardiology)**

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