SonoPath
Clinical Sonography & Telecytology
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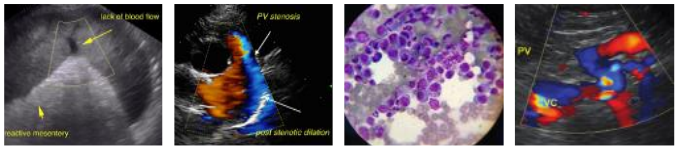


SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT
Maddox Livshin

SPECIES
Canine

BREED
Pekingnese

SEX
Male Neutered

AGE
13 years

WEIGHT
14lbs

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

IMAGING PERFORMED BY
Kelly Vazquez, CVT

HOSPITAL NAME
Englewood Cliffs Veterinary Hospital

REFERRING VET
Dr. Park

INVOICE
24533

DATE
6/2/22

PRESENTING CLINICAL SIGNS

History: Presented for coughing started on 5/26/22 - susp. bronchitis (rad review: cardiac silhouette normal in size, VHS of 10, tracheal lumen normal, normal bronchi, no present air bronchograms. Arrhythmia noted.
-Current medications: No improvement on Clavamox, but did improve on Lasix 6/1/22 - cough significantly decreased. Current meds: Lasix 6.25mgs BID, Clavamox 125 mgs PO BID.

ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.

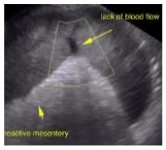
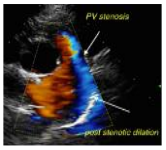
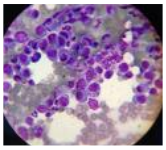
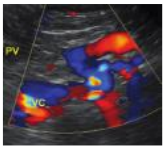
A single lead ECG is available; 25mm/s, sens np. The average heart rate is 110bpm (range 100-125bpm). The rhythm is sinus in origin, with a p for every QR complex. The P and QRS morphologies are positive. Occasional non-conducted P waves; low grade, 2:1. Slight prolongation in the PR interval is suspected most consistent with type I (Wenkebach); type II is not ruled out. No ectopic beats or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with respiratory variation. Occasional 2nd degree AV block (low grade, suspect type I).

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets with mild prolapse into the left atrial lumen. Mild eccentric mitral regurgitation with no left atrial dilation. Normal MR velocity. Normal LV diameter with adequate myocardial function. The tricuspid valve appears thickened with septal prolapse and mild tricuspid regurgitation. Normal velocity. Normal right atrial and ventricular diameter and morphology indicating no overt evidence of pulmonary arterial hypertension. 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	5.2	2.7	1.1	1.2	35	68	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	105	0.76	0.55	6.4	1.4	2.0	1.3
*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)

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Hansson et al, Vet Rad and Ultrasound 2002 Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995	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

Chronic degenerative valve disease causing mild mitral and trace tricuspid regurgitation. Lack of significant left atrial enlargement indicates the current risk for complication is low. No concurrent issues such as systolic dysfunction or pulmonary hypertension are noted in this study.

No cardiac medications are indicated at this time as the cough appears non-cardiac in origin. Lasix can be safely discontinued. Given a lack of response to Clavamoc, continued work up/treatment for infectious/inflammatory respiratory causes is recommended. Options include Baytril or similar antibiotic, anti-inflammatory prednisone, aggressive hydrocodone, etc. If refractory, may consider TTW/BAL for further information.

The ECG does show an occasional arrhythmia, which is consistent with low grade 2nd degree AV block. This implies that there are non-conducted P waves, however never more than one in a row. Type I block is suspected on this tracing, which implies the PR interval elongates prior to the block. Type I is typically due to high vagal tone and is often physiologic/benign. In a dog with respiratory disease, this may be the underlying cause. Type II block is also possible, which develops secondary to AV nodal disease. What is seen here is unlikely to cause clinical signs and most likely resolve with activity or excitement.

Further evaluation is advised through an atropine challenge (administer 0.04mg/kg atropine IV or IM and assess response); pending a normal response (heart rate doubles and maintains for 10-15 minutes) high vagal tone is diagnosed which is a benign cause. High vagal tone can be a normal variant or be secondary to a variety of systemic issues such as neurologic or respiratory disease. If the atropine challenge is normal, consider further evaluation for causes of high vagal tone. An abnormal response would indicate electrical dysfunction, and a holter monitor and/or referral should be considered.

No cardiac medications are clearly indicated. Assessment of progression in the future will help predict long term prognosis, which is highly variable at this stage (B1). Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit. Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes.

Anesthetic risk is considered mild if needed. Cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction, isoflurane gas) are recommended. Pre-oxygenate for 5-10 minutes prior to induction. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Mild IV fluid restriction is recommended to avoid fluid overload. Avoid heart rate stimulating drugs such as atropine unless clinically indicated.

Plan: Discontinue Lasix. Consider alternate antibiotic, hydrocodone, pred, etc as discussed. Consider an atropine challenge as discussed.

Chronic respiratory issues can certainly lead to pulmonary hypertension if poorly controlled and a recheck echocardiogram is recommended in 6-12 months to screen for development, sooner should any exertional syncope/dyspnea occur,

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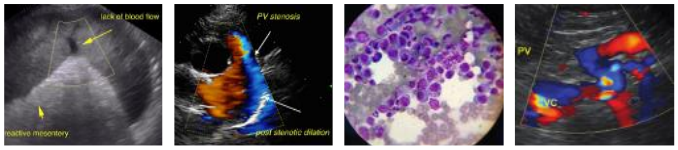

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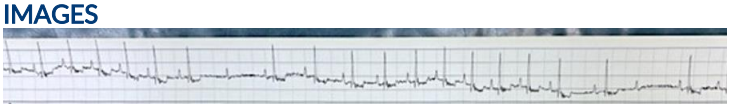
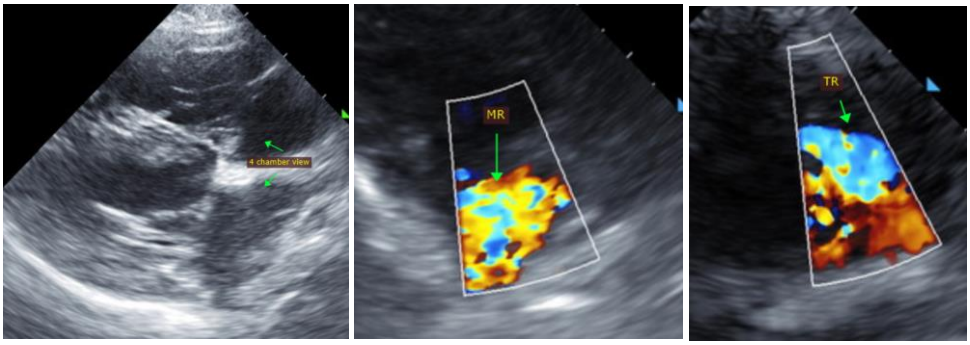
IMAGES





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