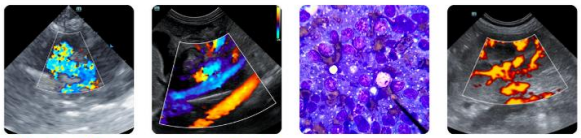
Imaging performed by

IntraPet Imaging

IntraPet.com



Clinical Sonography & Telecytology

Educational Teleconsultation Services™

SonoPath

FOSTERING THE ART OF VETERINARY MEDICINE™

SonoPath.com | info@sonopath.com | 1.800.838.4268

DATE

12.9.25

PATIENT

Miko Fox

SPECIES

Canine

BREED

Maltese

SEX

MN

AGE

4.15.14

WEIGHT

8.44lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

HOSPITAL NAME

Banfield Abingdon

REFERRING VET

Dr. Simpson

INVOICE

46098

PRESENTING CLINICAL SIGNS

History: Progressive, grade 3-4/6 heart murmur. Coughing/hacking episodes. CV: Normal rhythm, 3-4/6 heart murmur noted on today's exam femoral pulses equal.
-CXR report: Moderate bulge in the region of the left atrium on the lateral projections with a corresponding double-density sign on the orthogonal projection. Pulmonary vasculature is normal. Interstitial pattern in the perihilar region extending to the periphery of the right caudal lung lobe. Trachea is patent. Mediastinum and pleural space are normal. Included abdomen is normal. Osteophytosis at the included portion of the right stifle joint. Assessment: 1. Left-sided cardiomegaly is consistent with underlying cardiac disease such as degenerative mitral valve disease. Interstitial pattern in the perihilar region and right caudal lung lobe raises concern for cardiogenic edema but there is no clear evidence of pulmonary venous congestion to support this. 2. Normal included abdomen. 3. Right stifle osteoarthritis.
-Current medications: N/A.
-Sedation used: Not required to complete full diagnostic ultrasound.
-Pertinent previous ultrasound results: No previous.
-STAT: Approved.
-Imaging performed by: Stephanie Warga RDCS, RVT.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The mitral valve is diffusely thickened with significant prolapse into the left atrial lumen. There is severe mitral regurgitation present. Normal velocity. There is moderate to severe left atrial enlargement. There is mild left ventricular dilation. Left ventricular systolic function is hyperdynamic. There is normal systolic flow velocity across the aortic valve, no insufficiency. The aortic valve appears normal. Mild right atrial enlargement. Mild right ventricular enlargement with mild hypertrophy. The tricuspid valve is thickened with mild septal prolapse and trace tricuspid regurgitation. Velocity consistent with severe PAH. The pulmonary artery and branches are mildly dilated. Trace PI. Normal outflow velocity. No pericardial/pleural effusion or cardiac masses are 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	6.2	4.5	NM	2.0	55	87	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	167	1.0	1.0	3.8	2.2	3.0	1.4
*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 *Note: All measurements based upon multi-modal images and methods. An average value is reported.* Adapted from June Boon, Veterinary Echocardiography, 1998				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)

Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435 Hansson et al, Vet Rad and Ultrasound 2002 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)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Chronic degenerative valve disease causing severe mitral and trace tricuspid regurgitation. Moderate to severe left atrial enlargement indicates the risk for imminent spontaneous congestive heart failure may be elevated doing forward. Of additional concern, there is evidence of severe pulmonary hypertension (PAH), with mild right heart enlargement. This has likely developed secondary to respiratory disease and chronic LA pressure elevation in this case. No additional issues are identified.

The underlying genesis of PAH is poorly understood in cases other than heartworm infestation (this patient was negative), though it occurs with increased frequency in a variety of forms of **chronic lung disease** and in patients with idiopathic pulmonary fibrosis. Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to severe PAH. It is important to note that **the cough is not the result of pulmonary hypertension; rather the opposite is true with chronic respiratory disease leading to its development**. The most likely scenario in this case is that chronic airway disease has over time begun to affect the heart through development of PAH and increased right-sided pressures. Concurrent valve disease is essentially as a separate issue, although one certainly impacts the other.

Given the degree of disease seen here, Sildenafil is recommended in hopes of lowering pulmonary pressures. It is important to note that this is not expected to address the cough, which should be further evaluated/treated utilizing options such as hydrocodone, theophylline, etc. If an increase in symptom was noted, a course of Baytril may be attempted to cover any infectious exacerbant. If the cough continues to be refractory, advanced imaging/sampling may be useful (TTW/BAL), in addition to Radiologist review of the films, internal medicine consultation, etc. . Additionally, Pimobendan is warranted as below, given both the finding of both PAH and significant LA dilation/MR. The use of Lasix is debatable in this case, as dictated by the CXR report. Unless the patient exhibits any labored breathing, this is likely unnecessary.

Prognosis is guarded long term, with risk for progression to left or right-sided CHF, development of exertional dyspnea/collapse, and/or debilitating cyanosis.

Anesthesia is not advised at this time.

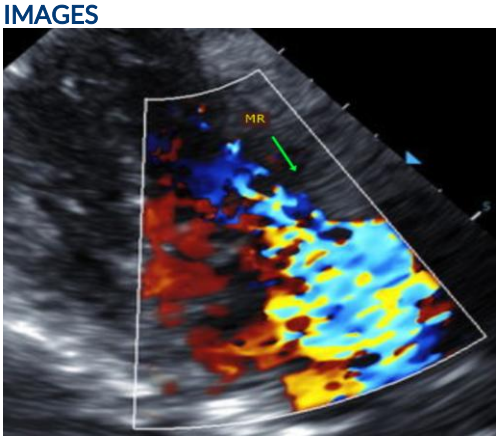
Omega fatty acid supplementation and mild salt restriction may also be of some long-term benefit. Monitor for development of a worsening cough, labored breathing, exercise intolerance or collapse episodes.

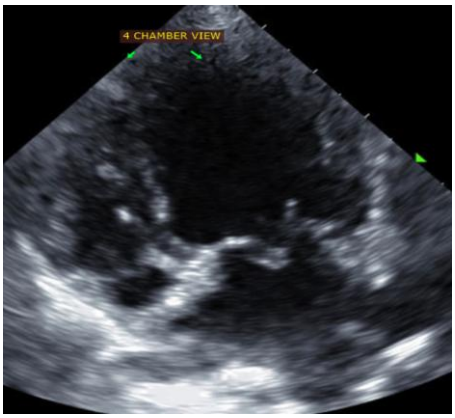
PLAN:

Institute Sildenafil 1-2mg/kg PO q12h. Administer Pimobendan 0.3mg/kg PO q12h. A baseline BP is recommended. Unless tachypnea or dyspnea develops, Lasix is likely unnecessary. Consider Hydrocodone, Baytril, theophylline, etc. as discussed.

Recommend recheck echocardiogram in 6 months to screen for progression, sooner if any development of clinical signs arise.

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