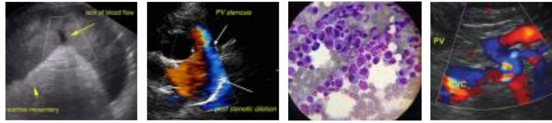


PATIENT
Smokey George

SPECIES
Canine

BREED
Chihuahua

SEX
MN

AGE
11y

WEIGHT
9.5lbs

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

HOSPITAL NAME
Ark AH

REFERRING VET
Dr. Parker

INVOICE
25220

DATE
7/8/22

PRESENTING CLINICAL SIGNS

History: Chronic cough - recently progressive. H/O atopy, food sensitivities - controlled on Apoquel and grain free diet. Long-standing murmur (4/6). Severe hypotension and bradycardia under anesthesia for COHAT (abscess) 7/6/2022. Crackles auscultated post-op. P started on pimobendan, furosemide and enalapril. P stable but RR 60 in clinic (30-40 at home) and crackles still present on recheck 7/7.
Heart Rate and Respiratory Rates HR 140 Blood Pressure Measurements 193/85:121map
Current Medications Cerenia, Clavamox, Denamarin, Levothyroxine, Pimobendan, Furosemide, Enalapril

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. Moderate eccentric mitral regurgitation with moderate left atrial dilation. Normal MR velocity. Normal LV diameter with adequate myocardial function. The tricuspid valve appears thickened with moderate tricuspid regurgitation. Velocity consistent with early PAH. Mild right atrial and ventricular enlargement. 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	4.9	2.8	NM	1.65	49	83	NM

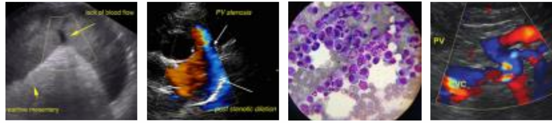
CANINE CARDIAC PARAMETERS	HR (BPM)	AV VMAX (m/s)	PV MAX (m/s)	BODY WEIGHT (kg)	LA 2D short axis Base view (cm)	LVIDd Avg; 2D and m-mode short axis (cm)	LVIDs Avg; 2D and m-mode short axis (cm)
NORMAL PARAMETER	50-100	0.7-1.7	0.7-1.6	BELOW	BELOW	BELOW	BELOW
PATIENT	122	1.3	0.95	4	1.9	2.3	1.2

*Normal chamber parameters expressed as a mean value (SD)

BODY WEIGHT DEPENDENT PARAMETERS

Body weight (kg)	LA	LVIDd	LVIDs
3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
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)
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)

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
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995



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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Chronic degenerative valve disease causing moderate mitral and tricuspid regurgitation. Moderate left atrial enlargement indicates there is relatively low risk for imminent complication, however risk for progression to spontaneous congestive heart failure in the future is elevated. Early pulmonary hypertension is noted which is likely secondary to a chronic cough in this case. No additional issues are identified.

Given the risk for progression and results of the EPIC trial, Pimobendan is indicated in this patient as below. Additional cardiac supportive medications are unlikely to be necessary relatively low risk for congestive heart failure. That being said anesthetic events can certainly lead to acute changes which must be considered. The patient has not reportedly responded to Lasix (i.e. crackles persist), and the importance of screening chest radiographs cannot be stressed enough. CHF is a radiographic diagnosis that can only be supported by ultrasound, and only moderate disease is seen here. Crackles are nonspecific and may reflect pulmonary edema or an ancillary pathology within the pulmonary tissue, particularly given a chronic yet progressive cough symptom. If CHF is ruled out on CXR, Lasix and enalapril can be safely discontinued and pulmonary therapy such as a broad spectrum antibiotic, theophylline, etc considered. Consider hydrocodone for QOL long term. If CHF is confirmed, these medications should be continued with more aggressive Lasix dosing and consideration of hospitalization. Radiologist review is strongly recommended given the complexity of the case.

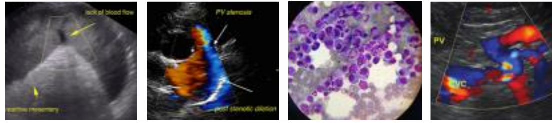
Assessment of progression in the future will help predict long term outcome; however, prognosis is guarded at this stage (B2).

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

Once the symptoms resolve, anesthetic risk is considered mildly elevated. Cardiac protective drug choices (opioid/benzodiazepine premedication, Propofol or alfaxalone induction, iso or sevo gas) are recommended. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Judicious IV fluid rates are recommended to avoid fluid overload. Avoid heart rate stimulating drugs such as atropine unless clinically indicated.

Plan: Administer heart muscle support Pimobendan 0.3mg/kg PO q12h. **Highly recommended CXR with Radiologist Review.** If CHF is present, continue Lasix/ACEI as discussed. If respiratory disease is present (suspected), these medications can be discontinued and pulmonary therapy instituted. Consider hydrocodone as discussed.

Recommend monitor for progression with a recheck echocardiogram in 6 months, sooner if any development of clinical signs.



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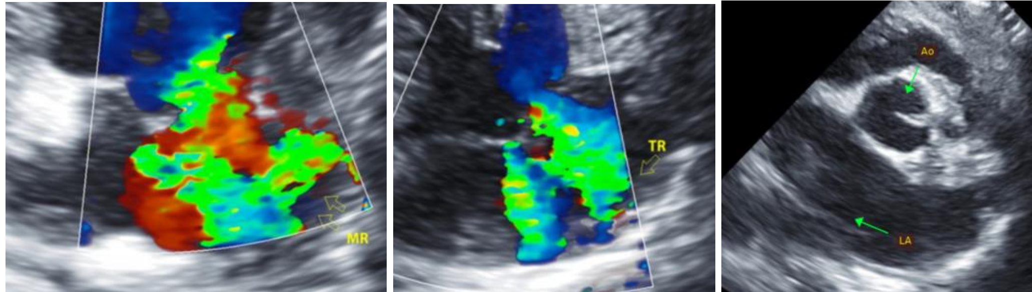
IMAGES



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. 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