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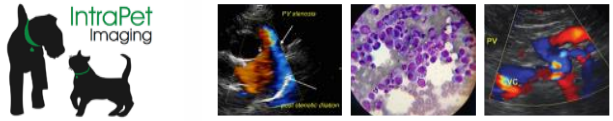

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PATIENT

Huckleberry Steber

SPECIES

Canine

BREED

Australian Shepherd

SEX

Male Neutered

AGE

3 years

WEIGHT

46.2lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

HOSPITAL NAME

Banfield Pet Hospital of Towson

REFERRING VET

Dr. Washington

INVOICE

21223

DATE

9/27/21

PRESENTING CLINICAL SIGNS

History: Patient presented yesterday with a hacking cough that started 24 hours previous. Radiographs were performed and pericardial effusion is suspected. Ruled out heartworm disease. Owner has been made aware that due to age, a congenital issue may be found and if so, would need a second full echocardiogram performed at referral. The owner has been made aware that the congenital issue would not be described in full here, nor recommendations other than referral. Upon further inquiry with owner, dog has had exercise intolerance since puppy. Would run, then collapse in hind end, be cyanotic. Quickly recovere.
-Pertinent abnormal PE/Chem/CBC/UA Results: Heartworm neg.
-CXR report: Moderate RHE, MPA bulge.
-Sedation used: Sedation not required for scan.
-STAT: STAT report requested.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Normal mitral valve leaflets with no obvious prolapse into the left atrial lumen. No obvious mitral regurgitation. Normal left atrial dimension. Normal LV diameter with adequate myocardial function. The LV wall appears normal. The tricuspid valve appears normal with no obvious insufficiency seen. Moderate right atrial dilation. Bubbles noted within the RA (Torb administered previously). Significant right ventricular dilation and hypertrophy indicative of pressure overload. Subtle septal flattening in systole. Pulmonic outflow velocities are normal. The pulmonic valve appears normal with mild to moderate pulmonic insufficiency. The MPA and proximal branches are significantly dilated. The aortic valve appears to have normal morphology and mobility. No obvious cardiac shunts are present. No pericardial or pleural effusion noted.

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	1.0	40	71	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	95	1.0	0.9	21.0	2.1	3.8	2.3
*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)
				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

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The most striking finding is significant pressure overload of the right heart. The main pulmonary artery and branches appear dilated without an obvious cause visualized. Rule outs for these findings include a branch (distal) pulmonic stenosis, primary pulmonary hypertension, secondary PAH due to lung disease (such as from a prior respiratory infection/inflammation like distemper, prior HW infestation, etc), an extra-cardiac R-L shunt (PDA), and/or other complex congenital abnormality not appreciated on this study. Advanced diagnostics are recommended in this unusual case in a relatively young dog. These include but are not limited to advanced echo, a bubble study, angiography, and/or thoracic CT scan. Consider referral in this complicated case.

If referral is declined, consider further patient evaluation looking for abnormalities such as **caudal cyanosis** or hemoconcentration which would suggest Eisenmenger's physiology from a R-L shunt. If neither is apparent, consider treating for pulmonary hypertension and assessing response. Finally, a full heartworm panel may be helpful to ensure false negative is not the case (along with an extensive history from birth of possible causative pulmonary issues).

Regardless of diagnosis, these findings are significant and will likely limit lifespan, with risk for right-sided CHF in the future. Prognosis is guarded to poor long-term, and our goal is to improve quality of life.

Monitor for development of associated clinical signs (collapse, abdominal distention, cough, labored breathing). Moderate exercise restriction is advised.

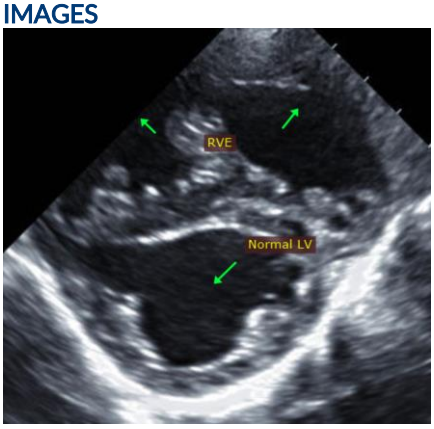
The cough is likely a separate issue from the cardiac changes (the exception being an acute on chronic respiratory issue with recent worsening) and warrants further treatment such as a course of Baytril, Hydrocodone, Theophylline, etc. Given a recent onset of the symptom, starting with Hydrocodone and a course of Baytril would be reasonable.

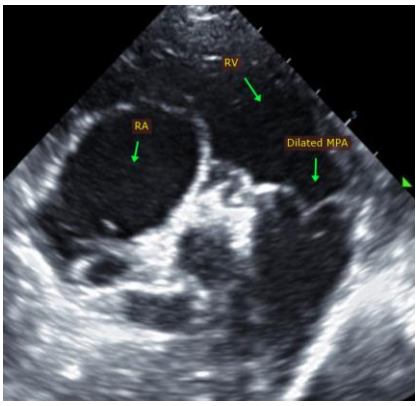
Anesthetic risk is elevated and is not advised prior to a definitive diagnosis.

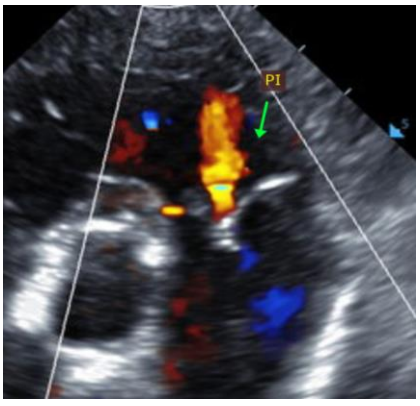
PLAN

Consider referral for advanced diagnostics if an option. Evaluate for caudal cyanosis, hemoconcentration, etc. If referral is declined, consider trial of Sildenafil 1-2mg/kg PO q8h and Pimobendan 0.3mg/kg PO q12h. Primary respiratory work-up/treatment is indicated as discussed.
Recommend recheck echocardiogram in 6 months to screen for progressive changes.

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
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