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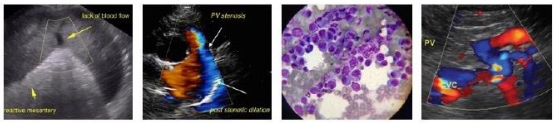

THE FOCAL ZONE
IMAGING PERFORMED BY
289-808-2608 info@thefocalzone.com

PATIENT
Curtis Thomas

SPECIES
Canine

BREED
Chihuahua

SEX
Male Intact

AGE
12 years

WEIGHT
14.3lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Kelly Reschny, RVT

HOSPITAL NAME
Grand River Veterinary Hospital

REFERRING VET
Dr. Robinson

INVOICE
20897

DATE
9/7/21

PRESENTING CLINICAL SIGNS

History: Presented to ER for lethargy and labored breathing of 1 week duration. ER suspected early CHF. Fluid on films with cardiomegaly. Improved overnight, repeat CXR showed improvement as well. Discharged on Lasix and Pimobendan. Loud murmur noted in the record, grade 5/6. Grade 1 noted on exam.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The mitral valve appears thickened with mild prolapse into the left atrial lumen. Moderate eccentric mitral regurgitation with moderate left atrial enlargement. Normal LV diameter with adequate myocardial function. The tricuspid valve appears thickened with moderate tricuspid regurgitation. TR velocity consistent with severe pulmonary hypertension. Moderate right atrial enlargement. Mild right ventricular dilation and hypertrophy consistent with severe pulmonary arterial hypertension. MPA and branch dilation. The pulmonic and aortic valves are normal in morphology and mobility. No pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. Scant pericardial effusion. No pleural effusion. No cardiac tumors observed.

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	5.5	4.8	1.6	1.9	37	69	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	130	0.9	0.8	6.5	2.2	3.1	1.9
*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

Severe pulmonary hypertension (PAH) present, as evidenced by an elevated TR velocity and right heart compensatory changes. The estimated systolic pulmonary arterial pressure is nearly 100mmHg, with normal being <25mmHg. This is causing hypertrophy and dilation of the right heart (indicating severe right-heart pressure overload). Clinical signs of weakness, heavy breathing, cyanosis, ascites and syncope are attributed to severe PAH.

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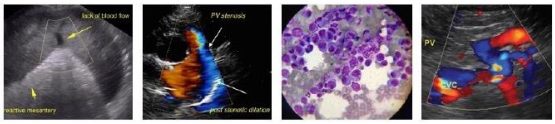

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Given these findings, effusion on prior films and persistent on exam today is likely due to right-sided CHF. There is also left-sided heart disease with moderate MR and moderate left atrial enlargement, which should be monitored going forward. No additional 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 chronic lung disease and in patients with idiopathic pulmonary fibrosis. Without a chronic history of coughing or heartworm disease, the etiology remains open. A heartworm test should be performed if not recently evaluated.

Patients with this degree of PAH can develop right-sided congestive heart failure (ascites, pleural, and/or pericardial effusion) as is seen in this case, debilitating cyanosis/labored breathing and exertional syncope if poorly controlled. The prognosis is poor with an MST of < 1 year after the onset of CHF, however a reasonable quality of life is expected once controlled.

Medical management of PAH and CHF is indicated as below and initial therapeutic dosages are indicated. If needed periodic centesis is recommended to improve comfort and/or appetite. If there is any question on response to diuretics, consider coverage with broad spectrum antibiotic such as Baytril.

Omega fatty acid supplementation may be of some long-term benefit.

Elective anesthesia is not advised.

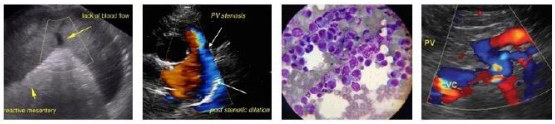
Monitor for development of a labored breathing, exercise intolerance or collapse episodes.

PLAN:

Screening BP recommended. Institute sildenafil 1-2mg/kg PO q8h. Institute pimobendan 0.3mg/kg PO q8h. Continue Lasix/furosemide 1-2mg/kg PO q12h. Institute spironolactone 1-2mg/kg PO q12h. If BP is >130mmHg, institute ACE-I (benazepril or enalapril) 0.5mg/kg PO q12h. If indicated, consider coverage with Baytril or similar.

Recommend renal panel in 10-14 days, then every 3-4 months lifelong.

Recommend recheck echocardiogram in 6 months to screen for progression, sooner if clinical signs develop in the interim.



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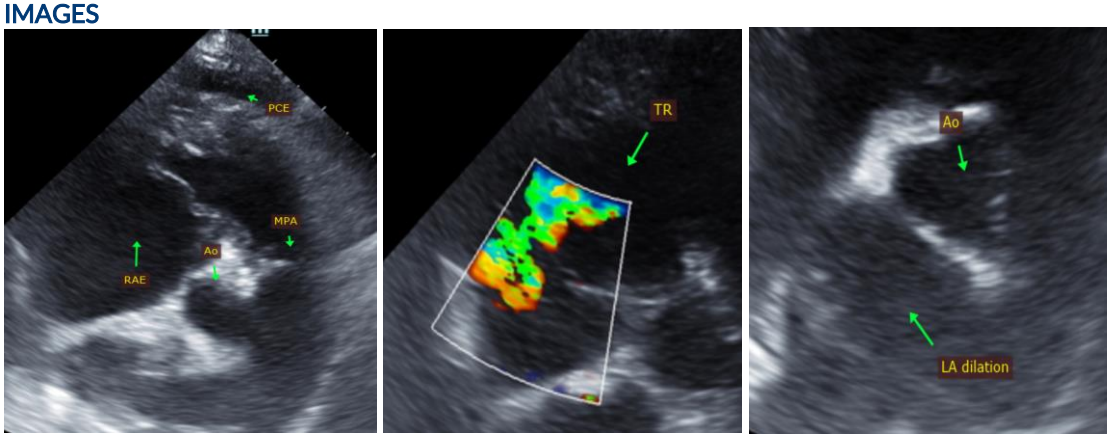
IMAGES



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