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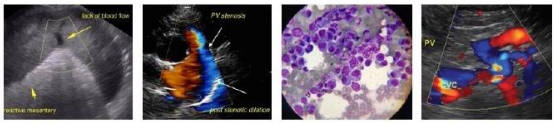


THE FOCAL ZONE
IMAGING PERFORMED BY
289-808-2608 info@thefocalzone.com

PATIENT
Dexter Lewis

SPECIES
Canine

BREED
Chihuahua

SEX
Male Neutered

AGE
14 years

WEIGHT
9lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Kelly Reschny, RVT

HOSPITAL NAME
Smithville Animal Hospital

REFERRING VET
Dr. Hulzebosch

INVOICE
21167

DATE
9/22/21

PRESENTING CLINICAL SIGNS

History: Labored breathing, inappetence, in congestive heart failure.
-Current medications: Vetmedin, Lasix, clavaseptin, fortekor, silymarin.
-Abnormal PE/Chem/CBC/UA Results: Elevated ALP, ALT, WBC, Gluc, SDMA, BUN, low sodium, chloride.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. Mild eccentric mitral regurgitation with mild left atrial dilation. Normal to decreased LV diameter with adequate myocardial function. Septal flattening in systole. The tricuspid valve appears markedly thickened with severe tricuspid regurgitation. Severe right atrial enlargement; severe right ventricular dilation and with significant hypertrophy consistent with severe pulmonary arterial hypertension. The pulmonic and aortic valves are normal in morphology and mobility. The MPA is significant dilated with moderate PI. Normal pulmonic and aortic outflow velocities. No AI. No pericardial or pleural effusion noted. No cardiac tumors observed.

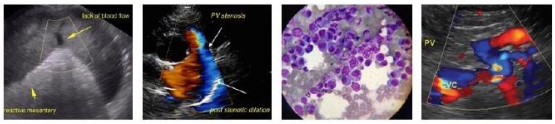
CARDIAC CHART

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	4.9	2.7	1.5	1.4	56	90	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	188	1.0	0.6	4.1	1.4	1.1	0.5
*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) is present, as evidenced by significant pressure overload of the right heart. The TR velocity is suspected to be a significant underestimation with an estimated systolic pulmonary arterial pressure is >100mmHg. This is causing hypertrophy and dilation of the right heart (indicating severe right-heart pressure overload). Clinical signs of weakness, heavy breathing, cyanosis, and syncope are



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attributed to severe PAH. The left atrium is only mildly enlarged, with hemodynamically insignificant MR. 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. If not performed, a heartworm antigen test is recommended. Given reported respiratory signs in this breed, the patient likely has underlying primary airway disease that over time has led to PAH. Patients with this degree of PAH and pulmonary disease can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

This patient is at risk for right-sided congestion; however, no expansion on the clinical diagnosis of CHF is provided. I would only treat this patient for CHF if effusions are seen on radiographs. Otherwise, a primary respiratory issue is considered more likely, and Lasix can actually lead to worsening of clinical signs. If not already performed, radiographs with a Radiologist review are strongly recommended.

Pending the results of chest radiographs, coverage with broad spectrum pulmonary antibiotic (fluoroquinolone) is likely recommended, in addition to aggressive vasodilation using pimobendan and sildenafil. Lasix/ACE-I should be discontinued unless CHF is confirmed. Consider hospitalization for oxygen support and IV antibiotics if patient appears unstable.

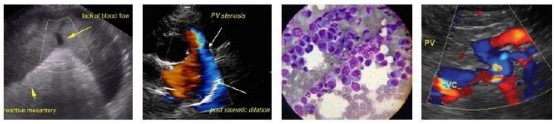
Once stable, use of theophylline and/or taper course of anti-inflammatory steroids can also be beneficial in these cases, to treat exertional dyspnea or acute flare ups and decrease the inflammatory component as much as possible. PRN use of cough suppressants may also be beneficial. Unfortunately, the prognosis overall is poor, however I am hopeful we can provide some medical relief going forward assuming the patient can be stabilized through the current crisis. Repeat chest films is recommended to understand the patient's pulmonary disease once the breathing has normalized.

Omega fatty acid supplementation (anti-inflammatory) may be of some long-term benefit. Monitor for worsening of labored breathing, exercise intolerance or collapse episodes.

PLAN

Strongly recommend chest radiographs to screen for CHF with a Radiologist review. If not present, immediate discontinuation of Lasix/ACE-I is recommended and consider fluid therapy. If CHF is suspected, continue diuretics with temporary discontinuation of ACE-I until patient is stabilized. Administer Pimobendan 0.3mg/kg PO q12h. Institute pulmonary antibiotics (Enrofloxacin 5-7mg/kg PO q24h for 10+ days) +/- oxygen for supportive care. Institute sildenafil (Viagra) 1-2mg/kg PO q8h. Depending on response/stability, can also consider bronchodilator such as theophylline, aminophylline, etc. Can also use hydrocodone and/or theophylline depending on chronic clinical signs of cough/exertional dyspnea.

Monitor renal values/BP in 1-2 weeks. If patient is breathing normally at this time, consider repeat chest radiographs to reestablish a baseline.



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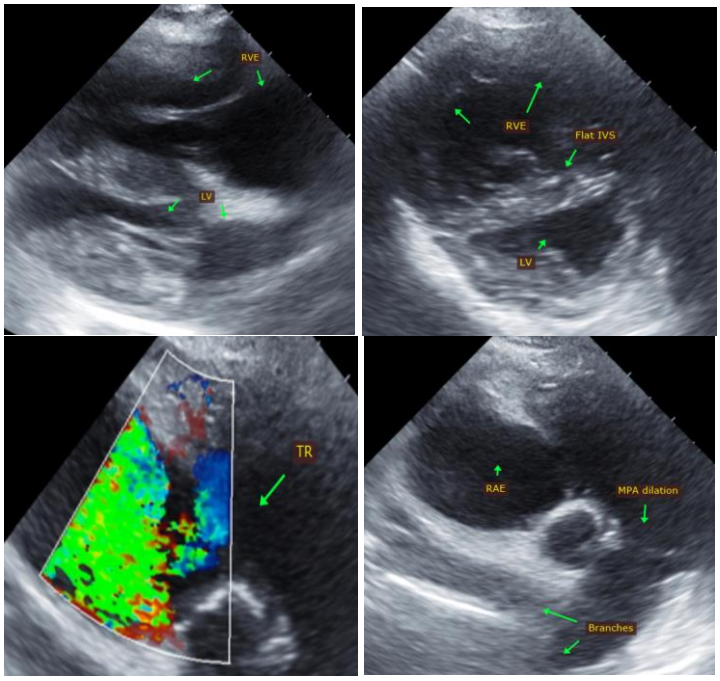
Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any development of clinical signs.

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