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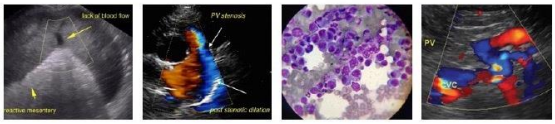

THE FOCAL ZONE
IMAGING PERFORMED BY
289-808-2608 info@thefocalzone.com

PATIENT
Charlie Joyce

SPECIES
Canine

BREED
Minature Schnauzer Mix

SEX
Female Spayed

AGE
14 years

WEIGHT
19.4lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Crystal Hill, RVT

HOSPITAL NAME
Graham Animal Hospital

REFERRING VET
Dr. Malatestinic

INVOICE
21373

DATE
10/5/21

PRESENTING CLINICAL SIGNS

History: 2-week history of sporadic "zoning out" behavior when on walks only and 2 known episodes of possible syncope last weekend. Geriatric dog in relatively good overall condition on PE except for severe dental disease. New HM ausculted today, grade 2-3/6. MS exam NAF.
-Current medications: Zentonyl 200mg SID, Clindamycin 75mg BID PO.
-Abnormal PE/Chem/CBC/UA Results: 3x elevated ALKP 626, and otherwise WNLs.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve leaflets with no obvious prolapse into the left atrial lumen. Trace mitral regurgitation with normal left atrial dimension. Normal LV diameter with adequate myocardial function. The tricuspid valve appears mildly thickened with moderate tricuspid regurgitation. Velocity consistent with severe pulmonary hypertension. Moderate right atrial enlargement; significant right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. Systolic flattening of the IVS consistent with pressure overload. The pulmonic and aortic valves are normal in morphology and mobility. Moderate MPA and branch dilation. Mild pulmonic and no aortic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion noted. No obvious cardiac tumors observed; however, visualization field is limited.

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	4.7	5.0	NM	1.0	56	92	0.22
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	NM	1.1	1.0	8.8	1.3	1.6	0.7
*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

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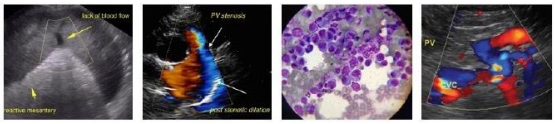

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is present, as evidenced by an elevated TR velocity and significant right heart compensatory changes. The estimated systolic pulmonary arterial pressure is >100mmHg, with normal being <25mmHg. The degree of hypertrophy and dilation of the right ventricle and MPA is indicative of severe right-heart pressure overload. Visualization is limited in this study and other possible causes of right-sided pressure overload should be also be considered, such as a peripheral tumor or other compressive issue. Advanced imaging may be useful in this case.

Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to severe PAH. It is important to note that PAH is not the cause of a cough in these cases, rather it develops secondary to a chronic cough/labored breathing. In a dog without reported historical respiratory signs, the primary cause is diffult to speculate upon. In general 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. Given the breed, chest x-rays are recommended with further respiratory historical information if available. Patients with this degree of PAH can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given reported syncope, medical management with Pimobendan and Sildenafil is certainly indicated as below. If there was acute worsening of any respiratory symptoms, Baytril or a similar antibiotic may also be useful. As mentioned previously, adequate cough control is also key to managing these cases if present.

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 improved medical relief going forward.
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:

Consider advanced imaging in this case to ensure no additional issues are identified.
Institute sildenafil 1-2mg/kg PO q8h. Institute Pimobendan at 0.3mg/kg PO q12h.
Consider hydrocodone as needed up to every 4-6hours PRN for cough if indicated.

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

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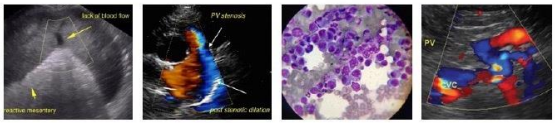

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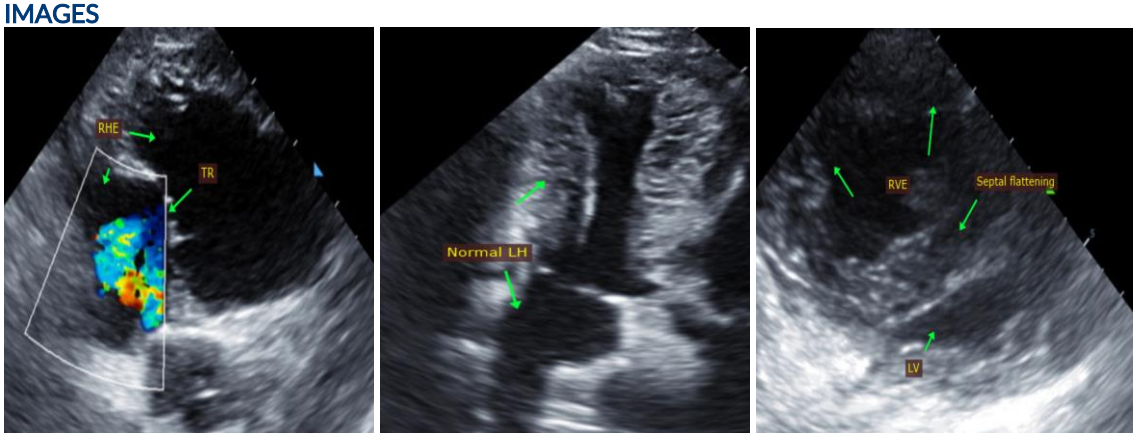
IMAGES



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