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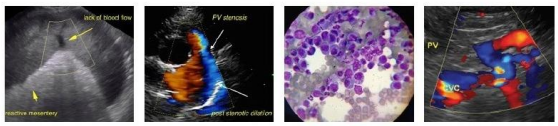


IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

PATIENT
Gracie Chapman

SPECIES
Canine

BREED
Yorkshire Terrier

SEX
Female Spayed

AGE
14 years

WEIGHT
7.1lbs

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

IMAGING PERFORMED BY
Loetitia St-Jacques, LVT/RVT

HOSPITAL NAME
Mount Rose Animal Hospital

REFERRING VET
Dr. Weldon

INVOICE
30625

DATE
5/4/23

PRESENTING CLINICAL SIGNS

History: Historical Cushing's. Presented a month ago for respiratory issues. Possible pneumonia versus PTE on CXR. Started Doxycycline 100mg tab BID and Clavamox 62.5mg BID x 10 days and oxygen. Improved but did not resolve. Started Baytril. Seizures started 2 weeks ago; started Zonisamide. Does best in oxygen. BP: 119, 128, 130, 131mmHg.
-Current medications: Gabapentin 250mg/5ml- 1.5cc BID-TID Ursodiol 250mg- 1/4-tab SID, Niacinamide 500mg- 1/4-tab BID, Zonisamide 25mg- 1 capsule BID, Zeniquin 25mg- 1/2-tab SID, Cerenia 16mg- 1/2-tab SID.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.

Right-sided cardiomegaly. No obvious evidence of CHF.

ELECTROCARDIOGRAPHIC FINDINGS

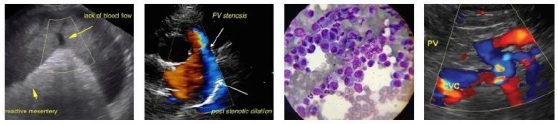
A six lead ECG is available at 50mm/s; 10mm/mV. The average heart rate is 80bpm (range 66-100bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P wave morphology is positive with a normal dimension. Normal PR. The QRS is inverted. The MEA is shifted right. No ectopic beats, pauses or dysrhythmias observed.
ECG diagnosis: Profound respiratory sinus arrythmia with a right axis deviation.

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. No mitral regurgitation with no left atrial dilation. Subtle septal flattening. Normal to decreased LV diameter with adequate myocardial function. The tricuspid valve appears thickened with prolapse and mild to moderate tricuspid regurgitation. Moderate right atrial enlargement; moderate right ventricular hypertrophy and enlargement consistent with severe pulmonary arterial hypertension. TR velocity is markedly elevated. The pulmonic and aortic valves are normal in morphology and mobility. Main PA and branch dilation. Normal pulmonic and aortic outflow velocities. Mild pulmonic insufficiency. 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	NA	>6.0	NM	1.3	30	52	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	NM	1.2	0.7	3.2	1.5	1.9	1.2
*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 **Note: All measurements based upon multi-modal images and methods. An average value is reported.*				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)



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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	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)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is present, as evidenced by an elevated TR velocity and secondary right heart enlargement. The estimated systolic pulmonary arterial pressure is >120mmHg, with normal being <25mmHg. This is causing significant hypertrophy and dilation of the right heart (indicating severe right-heart pressure overload). No additional valve leaks are seen, and left heart dimensions are normal.

Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to severe PAH. 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. COPD/chronic bronchitis and/or primary PF as an underlying cause is suspected, although PTE formation must also be considered in this case. 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.

Depending on severity of current clinical signs, consider anti-inflammatory steroids, bronchodilators, theophylline, etc. as needed. It is important to note that the PAH does not cause the cough; rather it develops secondary to the cough. Adequate cough control is therefore of the utmost importance in case management. Long-term prognosis is guarded to poor; however, if the patient's symptoms can be managed successfully, we can provide relief for some time going forward. The patient is reportedly in oxygen therapy, and it must be mentioned that quality of life should be reassessed. If there is not dramatic improvement on the medications below, euthanasia may have to be considered. Finally, depending on the nature of the episodes what is seen here may explain syncope if exertional in origin.

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

Institute sildenafil (Viagra) 1-2mg/kg PO q8h. Institute Pimobendan 0.3mg/kg PO q12h. Bronchodilators, cough suppressants, steroids, etc. as needed. If quality of life continues to suffer, euthanasia should be considered.

If patient does well, recommend recheck echocardiogram in 6 months.

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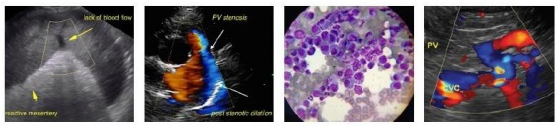

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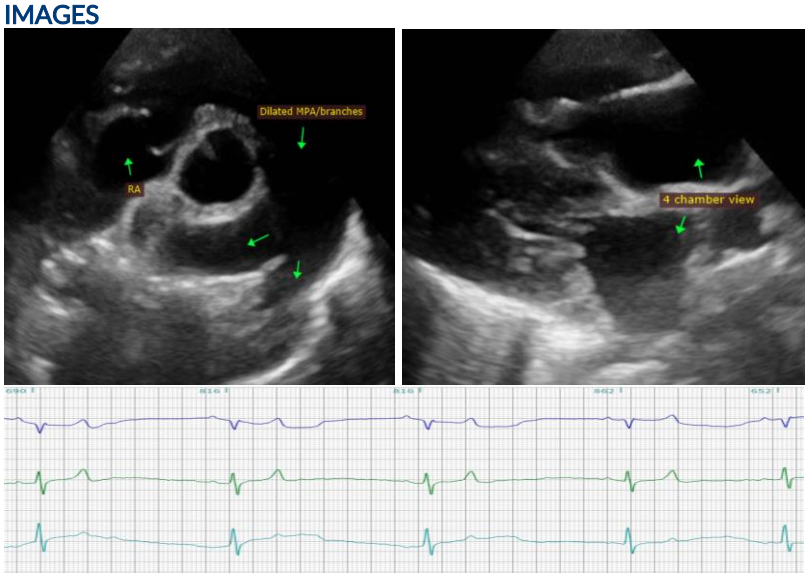
IMAGES



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