



PATIENT

Pickles Cleaver

SPECIES

Canine

BREED

Pug

SEX

FS

AGE

14y

WEIGHT

9.5kgs

PRESENTING CLINICAL SIGNS

History: Patient presented for acute onset of respiratory distress. History of recurring pneumonia, chronic cough, bronchiectasis, and tracheal collapse. Additional history of non-regenerative anemia. Over the summer, patient had one "fainting spell" where she collapsed for 1-2 seconds, then recovered. While hospitalized was started on IV fluids, Sildenafil, Cerenia, Ondasetron, Clavamox, Unasyn, and Trazadone.

Abnormal PE/Chem/CBC/UA Results: No murmurs ausculted. Dyspneic with crackles and wheezes ausculted bilaterally. Thoracic radiographs: Severe unstructured brochointerstitial pattern. EPOC: pH 7.266, pCO2 49.4, Lact 3.04, BUN 78, Crea 2.71, HCT 28 PCV/TP: 28% and 8.2

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 a normal left atrial dimension. Small LV diameter with adequate myocardial function. The tricuspid valve appears mildly thickened and mild tricuspid regurgitation. Moderate right atrial enlargement; moderate right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. TR velocity consistent with moderate PAH; however, this is thought to be an underestimation. The pulmonic and aortic valves are normal in morphology and mobility. Mild main PA and branch dilation. No pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. Trivial pericardial effusion in some views; inconsistent. No obvious pleural effusion. No cardiac tumors observed.

CARDIAC CHART

INTERPRETED BY

Maggie Machen
Lamy, DVM, DACVIM
(Cardiology)

IMAGING PERFORMED BY

Tom McNeill

HOSPITAL NAME

WVRC

REFERRING VET

Dr. Bianco

INVOICE

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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		3.7	NM	1.2	65	94	0.12
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	144	1.2	0.85	9.5	2.3	2.2	0.78
*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 <i>*Note: All measurements based upon multi-modal images and methods. An average value is reported.</i> 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				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)
				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)				



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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is present, as evidenced by an elevated TR velocity and right heart enlargement. The estimated systolic pulmonary arterial pressure is >80mmHg, with normal being <25mmHg. This is causing hypertrophy and dilation of the right heart and MPA (indicating right-heart pressure overload). The left heart dimensions are normal to small. No tumors or significant effusions are appreciated. That being said, scant pericardial effusion is suspected in some views although this is inconsistent.

Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to 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. Given the chronicity of the disease seen here (no chronic case history provided), COPD/chronic bronchitis and/or primary PF as an underlying cause with an acute secondary exacerbating insult (infectious or inflammatory) is suspected. Patients with this degree of PAH and pulmonary disease can develop right-sided congestive heart failure (ascites/pleural effusion), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given the recent history of acute collapse and respiratory signs, the most common cause is an infectious or inflammatory insult causing a decline in already poor oxygenation status. A PTE cannot be ruled out. Coverage with broad spectrum pulmonary antibiotic (fluoroquinolone) is recommended, in addition to aggressive vasodilation using pimobendan and sildenafil. I would not utilize a diuretic, as decreasing blood volume can further decrease preload and worsen clinical signs. There may be risk for right-sided CHF in the future; however, no significant effusions are noted making this unlikely. If the patient experiences any additional respiratory compromise, continued hospitalization for oxygen support and IV antibiotics may be necessary. Consider fluid therapy to help increase preload.

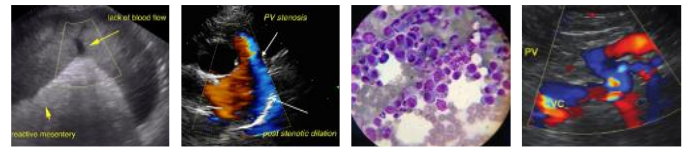
Once stable, use of theophylline and/or taper course of anti-inflammatory steroids can also be beneficial in these cases, to treat exertional dyspnea or acute flare ups and decrease the inflammatory component as much as possible. PRN use of cough suppressants may also be beneficial. Unfortunately, the prognosis overall is poor, however I am hopeful we can provide some medical relief going forward.

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 Pimobendan 0.3mg/kg PO q12h. Institute sildenafil (Viagra) 1-2mg/kg PO q8h. Consider course of Baytril and oxygen support. Can also use hydrocodone and/or theophylline depending on chronic clinical signs of cough/exertional dyspnea. Consider fluid therapy.

Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any recurrent clinical signs are identified.



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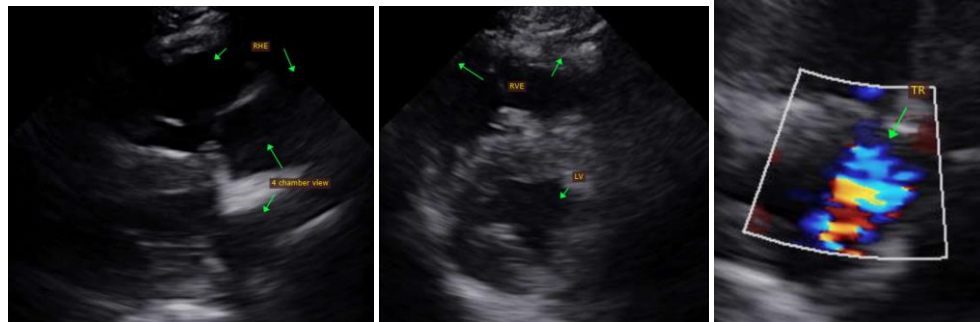
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IMAGES



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. 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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