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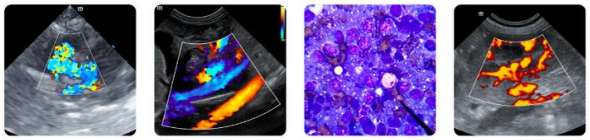


Clinical Sonography & Telecytology
Educational Teleconsultation Services™

SonoPath.com info@sonopath.com 1.800.838.4268

PATIENT

Coco Ducommun

SPECIES

Canine

BREED

Chihuahua Mix

SEX

Male Neutered

AGE

14.8 years

WEIGHT

15.4lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Mariusz Chmielinski, DVM

HOSPITAL NAME

Apex Veterinary Services Ltd.

REFERRING VET

Alpine 24/7 / ER doctor

INVOICE

47726

DATE

PRESENTING CLINICAL SIGNS

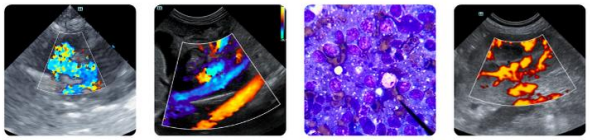
History: Recurrent exertional syncope (collapse with transient LOC ~10–15 sec, rapid recovery). Chronic cough (known tracheal collapse). Recent worsening RE ("air hunger"). Intermittent disequilibrium/head bobbing. No GI signs.
Abnormal PE/Chem/CBC/UA Results: Temperature: 37.7°C. Heart Rate: 110 bpm (regular). RR: 36/min. RE: Normal. Mucous membranes: Pink, moist. CRT: <2 sec. Blood Pressure: 150/100 (MAP 109). SpO_2: 99% (room air). CXR showed bronchial pattern, mild interstitial/alveolar pattern, dynamic tracheal collapse, VHS 10.21, hepatomegaly. TFAST: mild bilateral B-lines (1–3/field).

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. Mild mitral regurgitation with a normal/small left atrial dimension. Normal velocity. Small LV diameter with normal myocardial function. The tricuspid valve appears thickened and prolapsing, and there is mild to moderate tricuspid regurgitation. Velocity consistent with severe pulmonary hypertension; 120mmHg. Moderate right atrial enlargement; severe right ventricular dilation and hypertrophy consistent with severe pulmonary arterial hypertension. Systolic flattening of the IVS consistent with pressure overload. The pulmonic and aortic valves are normal in morphology and mobility. Significant MPA and branch dilation. Mild to moderate pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. 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	4.8	5.0	1.3	1.2			0.03
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		1.3	0.8	7.0	1.5	1.8	1.3
*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)
Adapted from June Boon, Veterinary Echocardiography, 1998				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435				30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
Hansson et al, Vet Rad and Ultrasound 2002				35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995				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

There is severe pulmonary hypertension (PAH) present, as evidenced by an elevated TR velocity and 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. The left heart is normal, with a small mitral regurgitation.

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.** 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 breed, chest x-rays and case history, primary respiratory disease as an underlying cause is suspected in this case. Patients with this degree of PAH and respiratory disease can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given reported syncope and a chronic cough with recent worsening, 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 vasodilation using Sildenafil as below. No clear indication for Lasix/ACEI as diuretics can actually further reduce preload in cases of debilitating PAH and worsen clinical signs. Continued hospitalization for oxygen support and IV antibiotics may be necessary.

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: Institute sildenafil 1-2mg/kg PO q8h. Institute fluoroquinolone and additional pulmonary support as discussed. Consider hydrocodone as needed up to every 4-6hours PRN for cough. If symptoms persist, consider taper course of anti-inflammatory steroids.

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

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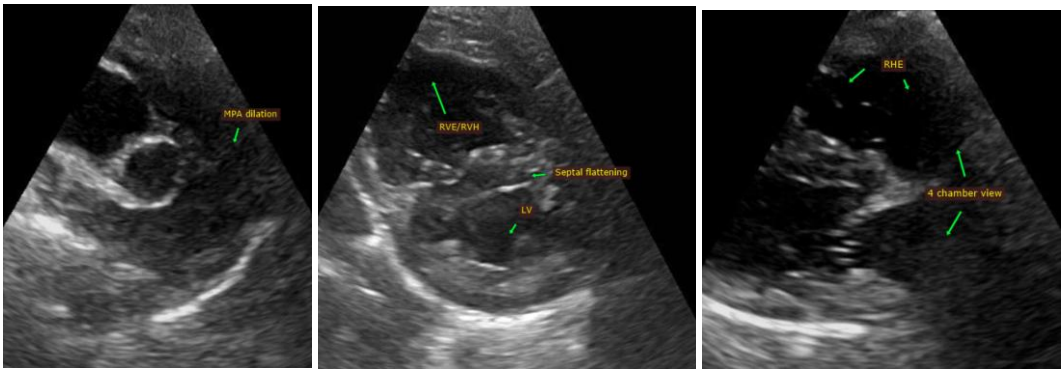
IMAGES



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