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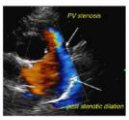
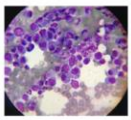
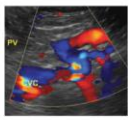

SonoPath
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PATIENT

Buddy Johnson

SPECIES

Canine

BREED

Maltese

SEX

Male Neutered

AGE

14 years

WEIGHT

11.25lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Tom McNeill

HOSPITAL NAME

SVS Imaging CT

REFERRING VET

Dr. Brown

INVOICE

23927

DATE

4/27/22

PRESENTING CLINICAL SIGNS

History: Patient presented for tachypnea and dyspnea. Wheezes on auscultation.
-Radiographs; Revealed cardiomegaly (VHS 12) with pulmonary edema consistent with congestive heart failure.
-Abnormal PE/Chem/CBC/UA Results: Elevated BUN and Phosphorous.

ECHOCARDIOGRAM FINDINGS

2D, MM, color/spectral Doppler study available for interpretation. The mitral valve appears mildly thickened with no prolapse into the left atrial lumen. No mitral regurgitation with no left atrial dilation. Normal LV diameter with adequate myocardial function. The tricuspid valve appears thickened with moderate tricuspid regurgitation. TR velocity consistent with severely elevated pulmonary arterial pressures; PG: >80mmHg. Moderate to severe right atrial enlargement; significant right ventricular dilation and hypertrophy consistent with severe pulmonary arterial hypertension. Mild MPA and branch dilation. The pulmonic and aortic valves are normal in morphology and mobility. Trace pulmonic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion is visualized. Ascites seen on subcoastal views. 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	4.5	1.3	1.3	52	86	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	160	NM	1.1	5.1	1.8	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

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

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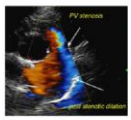
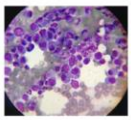
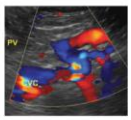

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Severe pulmonary hypertension (PAH) present, as evidence by an elevated TR velocity and right heart compensatory changes. The estimated systolic pulmonary arterial pressure is >80mmHg, with normal being <25mmHg. This is causing severe hypertrophy and dilation of the right ventricle (indicating severe right-heart pressure overload). Clinical signs of weakness, heavy breathing, cyanosis, ascites and syncope are attributed to severe PAH. Given these findings, the peritoneal effusion is no question due to right-sided CHF. Pulmonary edema is considered extremely unlikely without left heart disease. It is more likely that this patient has a primary respiratory insult that is leading to tachypnea.

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. Without a chronic history of coughing or heartworm disease, the etiology remains open. A heartworm test should be performed if not recently evaluated.

Patients with this degree of PAH can develop right-sided congestive heart failure (ascites, pleural, and/or pericardial effusion) as is seen in this case, debilitating cyanosis/labored breathing and exertional syncope if poorly controlled. The prognosis is poor with an MST of < 1 year after the onset of CHF, however a reasonable quality of life is expected once controlled.

Medical management of PAH and CHF is indicated as below and initial therapeutic dosages are indicated. If indicated a therapeutic abdominocentesis is recommended to improve comfort and/or appetite. Additionally, **the chest radiographs should be submitted for a Radiologist review for a more advanced pulmonary evaluation. A primary respiratory issue is suspected, as mentioned.**

Omega fatty acid supplementation may be of some long-term benefit.

Elective anesthesia is not advised.

Monitor for development of a labored breathing, exercise intolerance or collapse episodes.

PLAN:

Consider therapeutic abdominocentesis if uncomfortable and/or inappetant. Screening BP recommended. Institute sildenafil 1-2mg/kg PO q8h. Institute pimobendan 0.3mg/kg PO q8h. Institute Lasix 1mg/kg PO q12h. Institute spironolactone 1-2mg/kg PO q12h. If BP is >130mmHg, institute ACE-I (benazepril or enalapril) 0.5mg/kg PO q12h. Radiologist review of the films strongly recommended with treatment for primary pulmonary issues (i.e., Baytril, etc.). Consider hospitalization for O2 support if the patient appears unstable.

Recommend renal panel and BP in 10-14 days, then every 3-4 months lifelong.

Recommend recheck echocardiogram in 6 months to screen for progression, sooner if clinical signs develop in the interim.

IMAGES

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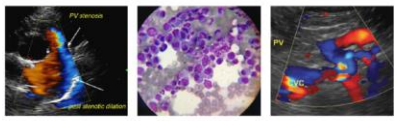

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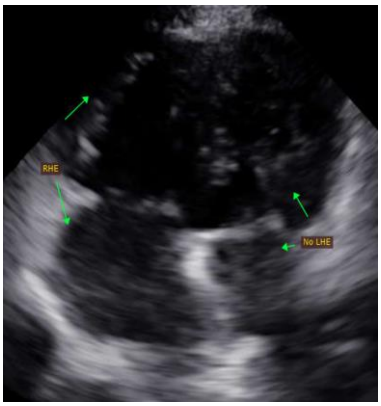

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)
info@sonopath.com