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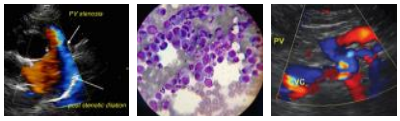

SonoPath

Clinical Sonography & Telecytology

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PATIENT

Brianna King

SPECIES

Canine

BREED

Biewer Terrier

SEX

Female Spayed

AGE

12.8.07

WEIGHT

6.34lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

HOSPITAL NAME

Northwind Animal Hospital

REFERRING VET

Dr. Jones

INVOICE

30531

DATE

5.2.23

PRESENTING CLINICAL SIGNS

History: Recheck echo. Breathing heavier over the weekend, doing better now but seems off balance and owner was concerned about seizures.
-Current medications: Furosemide 5mg BID.
-Blood pressure: 85mmHg systolic.
-Sedation used: Not required to complete full diagnostic ultrasound.
-Pertinent previous ultrasound results (10/2020 MML): Normal with trace MR. no PAH. Cough noted at that time.
-STAT: Requested/Approved.
-Imaging performed by: Stephanie Warga RDCS, RVT.

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

Severe right heart enlargement with MPA dilation. No obvious evidence of CHF.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve leaflets with prolapse into the left atrial lumen. Trace mitral regurgitation with normal left atrial dimension. Decreased LV diameter with adequate myocardial function. The tricuspid valve appears thickened with septal prolapse and severe tricuspid regurgitation. Velocity consistent with severe pulmonary hypertension. Severe right atrial enlargement; significant right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. Septal flattening in systole consistent with pressure overload. The pulmonic and aortic valves are normal in morphology and mobility. Moderate MPA and branch dilation. Moderate pulmonic insufficiency. Elevated velocity. No AI. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion noted. No cardiac tumors observed. Ascites noted by the sonographer.

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	NM	5.2	NM	1.3			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	0.98	2.9	1.4		
*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

Severe pulmonary hypertension (PAH) is present, as evidenced by severe TR, an elevated TR velocity and right heart/ MPA changes. The estimated systolic pulmonary arterial pressure is >100mmHg, with normal being <25mmHg. This is causing severe hypertrophy and dilation of the right ventricle (indicating severe right-heart pressure overload). The left heart is essentially normal with a small mitral regurgitation. Compared to the 2020 study, which was normal, there is clearly obvious evidence progression.

Clinical signs of weakness, heavy breathing, cyanosis, **ascites 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. A heartworm test should be considered; however, given the history chronic respiratory disease is the likely underlying issue.

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

Medical management of PAH and CHF is indicated as below and initial therapeutic dosages are indicated. We must be cautious with diuretics, as maintaining preload with PAH is important while keeping fluid retention at bay. A therapeutic abdominocentesis should be repeated if or when the patient is inappetant or uncomfortable going forward. Our goal is to control the effusion as it is unlikely to completely resolve.

Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.

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

PLAN

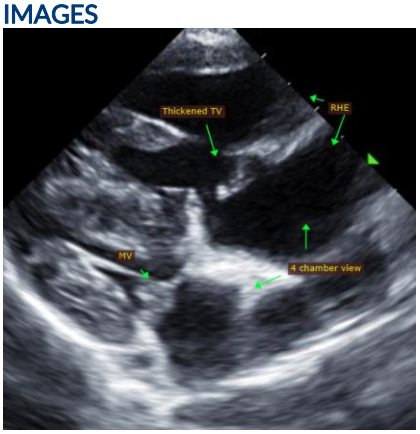
Heartworm test recommended. Institute sildenafil 1-2mg/kg PO TID. Institute spironolactone 1-2mg/kg PO BID. Continue low-dose Lasix 1mg/kg PO q12h. Institute Pimobendan 0.3mg/kg PO BID.

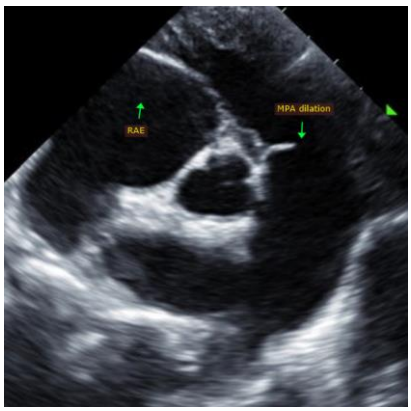
Recommend renal panel and BP in 10-14 days, then every 3-4 months lifelong on diuretics. If BP is >130mmHg and patient is doing well at home, institute ACE-I 0.5mg/kg PO q12h.

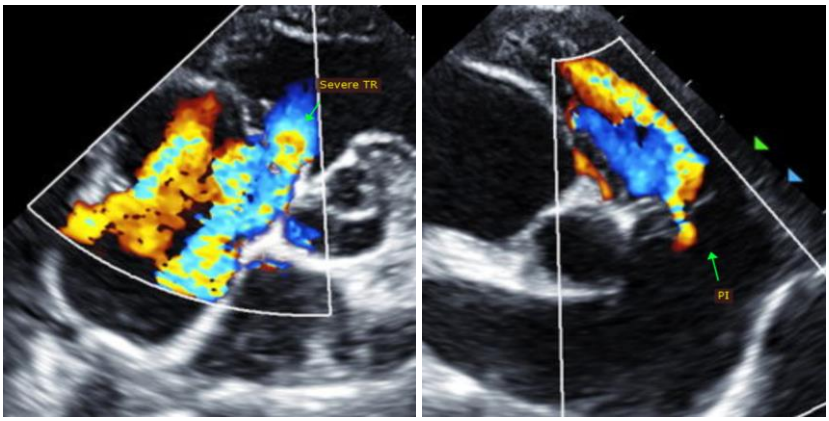
Going forward, abdominocentesis is recommended PRN to maintain comfort and appetite.

Once stabilized, recommend recheck echocardiogram in 6 months to reassess structure and function, sooner if any development of clinical signs.

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.

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