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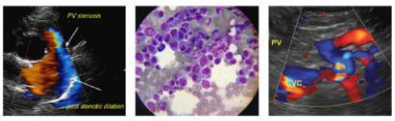
SVS IMAGING



SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

PATIENT
Hershey Valls

SPECIES
Canine

BREED
Doberman Pinscher

SEX
Male Neutered

AGE
7 years

WEIGHT
105lbs

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

IMAGING PERFORMED BY
Kim Liedberg

HOSPITAL NAME
SVS Imaging WI

REFERRING VET
Dr. Boockmeier

INVOICE
26138

DATE
8/31/22

PRESENTING CLINICAL SIGNS
History: History of coughing. Increased respiratory rate and effort when laying down. Gallop rhythm along with grade 2/6 left side apical heart murmur. Crackling lung sounds.
-Current medications: Lasix 120mg TID, Pimobendan 15mg BID.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.
Mild cardiomegaly. Concern for imminent CHF.

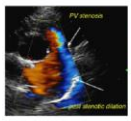
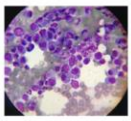
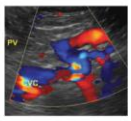
ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.
A single lead ECG is available; 25mm/s, 10mm/mV. The average heart rate is 140bpm (range 136-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. Isolated VPCs are seen throughout; singles only and monomorphic. No supraventricular premature beats, pauses or other dysrhythmias observed. ECG diagnosis: Normal sinus rhythm with isolated VPCs.

ECHOCARDIOGRAM FINDINGS
2D, m-mode, color flow and doppler imaging is available. Moderate left ventricular dilation with decreased systolic function and increased sphericity. Decreased LV wall thickness. Severe left atrial enlargement. The mitral valve appears normal in form and function, with no obvious prolapse into the left atrial lumen. No significant mitral regurgitation. Tricuspid valve appears normal in form and function. Mild right atrial and ventricular dilation. No significant tricuspid regurgitation. The aortic valve is normal in morphology and mobility. Blood flow through the LVOT and RVOT is normal. No aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No obvious cardiac tumors.

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	4.5	NA	1.5	2.1	15	25	0.2
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	126	1.5	0.98	47.6	5.6	6.1	5.2
*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)
				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

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately, this patient has severe cardiomyopathy and systolic dysfunction. This is causing dilation and volume overload of both the left and right heart. The severity of dysfunction and pump failure is significant and puts the patient at exceedingly high risk for decompensation. Going forward, the patient will always be at risk for right and/or left-sided CHF, development of arrhythmias/syncope and/or sudden death going forward.

Systolic failure can be primary in nature (DCM) or secondary to taurine deficiency, myocarditis, tachycardia-induced cardiomyopathy, or infiltrative disease such as lymphoma. In a 7-year-old Doberman, primary disease is certainly suspected; however, consider testing for alternative causes that may be treatable. A troponin (cTnI) level can be submitted to further investigate infiltrative/inflammatory contribution (myocarditis). Additionally, a taurine level may be helpful (screen for malabsorption issue), and a thorough diet history given the recent correlation with grain free/boutique brand/exotic ingredient diets. Finally, further systemic evaluation for underlying infiltrative contribution such as neoplasia is also reasonable (abdominal ultrasound, etc.).

The ECG does confirm sinus tachycardia with frequent single ventricular premature contractions (VPCs). VPCs are ectopic beats generated from abnormal conductive or fibrotic tissue in the ventricles of the heart muscle, and even frequent single VPCs will often cause no clinical signs in dogs. When sustained however, ventricular tachycardia can lead to symptoms such as lethargy and collapse. Given the severity of structural disease, this is the cause of the arrhythmia. No treatment is indicated, based upon a lack of syncope and only isolated beats seen. Follow up is advised, particularly should any syncope be noted.

Regardless of cause, prognosis is guarded to poor at this stage in the disease process, with an average survival time of <6 months. The only treatable cause of systolic failure is diet/taurine deficiency, which is uncommon on commercially formulated dog foods. If the diet is of concern, highly recommend immediate diet change and taurine supplement regardless of blood taurine results. Please see the FDA website for more information.

Institution of full cardiac supportive medications is recommended as below due to severity of disease seen here, CXR findings and clinical history. If patient is or becomes unstable, consider hospitalization for supportive care.
Elective anesthesia is not advised.

Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit. Monitor for development of a cough, worsening labored breathing, abdominal distention, exercise intolerance or collapse episodes in the future. Monitoring of sleeping breathing rates at home is recommended to assess response to medications and recurrence of CHF in the future.

PLAN

Consider hospitalization if indicated. Institute Spironolactone 1-2mg/kg PO q12h. Administer furosemide 1-2mg/kg PO q8h for 3-5 days. If improved, decreased to q12h at that time. Institute Pimobendan 0.3mg/kg PO q12h. Institute taurine 1000mg PO q12h. Diet history/change as discussed. Institute taurine supplement 1000mg PO q12h.

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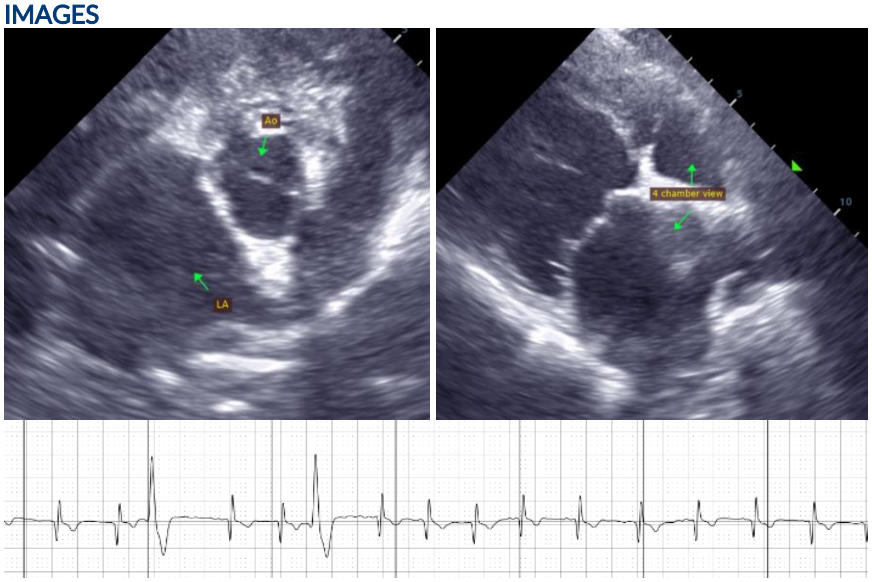
Monitor a renal panel, ECG and blood pressure in 1-2 weeks to ensure tolerance. If BP >130mmHg, institute ACEI 0.5mg/kg PO q12h. Consider cTnI, taurine level, AUS as discussed above.

A recheck echocardiogram and ECG are recommended in 6 months to screen for progression, sooner if clinical issues arise in the interim.

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