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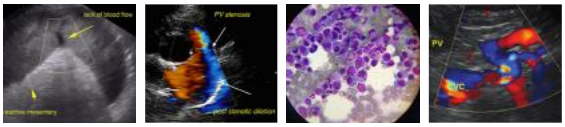


ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Boss Creighton

SPECIES
Canine

BREED
Great Dane

SEX
Male Intact

AGE
11 years

WEIGHT
144.4lbs

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

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
West Hills Animal Hospital

REFERRING VET
Dr. Remcho

INVOICE
30206

DATE
4/12/23

PRESENTING CLINICAL SIGNS

History: Recheck echo – from OSU mild DCM. Assess for progression. Doing well at home.
-Current medications: Gabapentin.
-CXR report (3/28/2023): Mild cardiomegaly. No CHF.
-Pertinent previous echo findings (3/2022 OSU): Mild increase in LVIDs, LVIDd is normal, FS is mildly reduced. Moderate MR, remainder NSF.

ELECTROCARDIOGRAPHIC FINDINGS

A six lead ECG is available at 25mm/s; 10mm/mV. The average heart rate is 280bpm with a regular rhythm. The QRS is upright and narrow. No identifiable P waves.
ECG diagnosis: Rapid supraventricular tachycardia; suspect atrial origin.

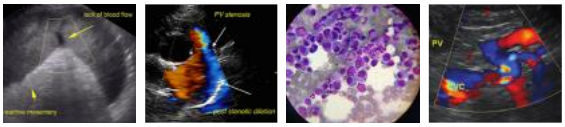
ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Moderate left ventricular dilation with decreased systolic function. Decreased LV wall thickness and increased sphericity. Severe left atrial enlargement. The mitral valve appears mildly thickened with no obvious prolapse into the left atrial lumen. Moderate eccentric mitral regurgitation. Normal MR velocity. The tricuspid valve appears mildly thickened. Mild right atrial and ventricular dilation. Mild tricuspid regurgitation, velocity consistent with early pulmonary hypertension. The aortic valve is normal in morphology and mobility. Trace aortic and pulmonic insufficiency. Normal pulmonic valve. Decreased LVOT and RVOT velocities. Scant pericardial effusion noted. No pleural effusion. Early hepatic congestion suspected on subcostal views. No obvious cardiac tumors. Rapid rate and rhythm noted throughout.

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	6.1	3.2	2.0	2.5	10	19	1.4
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	260	0.5	0.5	65.5	6.0	6.7	6.0
*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)
				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)

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



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Clin North Am 15:1177, 1995	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)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately, this patient has significant cardiomyopathy and systolic dysfunction. This is causing dilation and overload of all 4 chambers resulting in insufficiency of the mitral and tricuspid valves. There is severe LA and LV dilation indicating high risk for complication going forward. Early pulmonary hypertension is noted, which is likely due to active congestion. No additional issues are identified. This is obviously progressive compared to the prior study.

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 senior large breed dog, primary disease is suspected; however, consider testing for primary causes that may be treatable. A thyroid and taurine level can be submitted to further investigate infiltrative/inflammatory contribution (myocarditis). Additionally, a taurine level may be helpful (screen for malabsorption issue) with avoidance of grain free, exotic ingredient or boutique brand options going forward.

Regardless of cause, prognosis is guarded to poor at this stage in the disease process, with an average survival time of <6 months. Patient will always be at risk for recurrent CHF, development of malignant arrhythmias and/or sudden death in the future. The only treatable cause of systolic failure is taurine deficiency, which is uncommon on commercially formulated dog foods (albeit renewed with the recent correlation to grain free diets). If a taurine level is declined, it is also reasonable to simply supplement with taurine on the off chance of a malabsorption issue.

As a complicating factor, the patient has also developed a rapid supraventricular tachycardia (SVT) secondary to atrial dilation. The most likely diagnosis is Atrial Tachycardia given the appearance and regular rhythm. Development of the arrhythmia is likely what led to early congestion (effusion), although it is unusual to not see clinical signs arise. Tachycardia of any origin (when sustained) leads to right sided congestion (tachycardia-induced cardiomyopathy), while the structural disease leads to left-sided congestion (edema). The increase in the heart rate leads to clinical signs and early CHF as we see in this patient. Lifelong diuretics and management of the structural disease in addition to management of the heart rate as below. Close monitoring going forward is advised.

Consider 24 hour hospitalization in this case, due to the severity of disease, need for rhythm conversion and aggressive management/monitoring.

Once stabilized, monitoring of sleeping respiratory rates will be paramount to screen for recurrent congestive heart failure at home in the future. Cough suppression to improve QOL can also be considered once diuretics are on board for any residual mechanical cough in the face of normal sleeping respiratory rates.

Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes in the future. Omega fatty acid supplementation (1000mg once to twice daily) and mild salt restriction may be of some long-term benefit.

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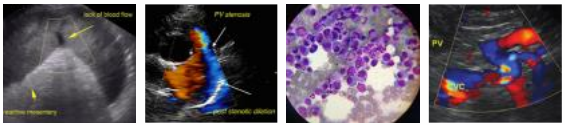

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PLAN:

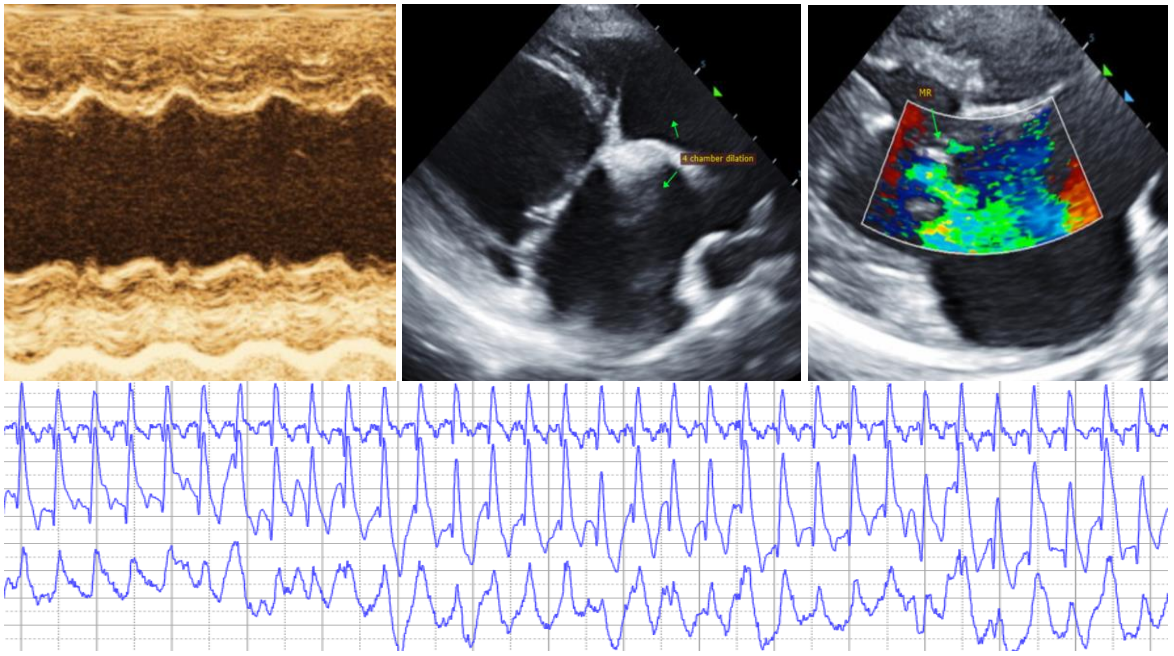
If the patient is or becomes unstable, recommend offer referral for 24-hour monitoring/supportive care and IV conversion therapy/diuretics. Recommend the following oral medications: Pimobendan 0.3mg/kg PO q12h, Lasix 1-2mg/kg PO q12h; Spironolactone 1-2mg/kg PO q12h; Diltiazem 1-2mg/kg PO q8h. Institute taurine supplement 1000-2000mg PO q12h. Consider diet history, taurine level, cTnI, etc. as discussed.

Recheck BP, heart rate/ECG and renal values in 5-7 days. If BP >130mmHg and patient is feeling well, institute Benazepril at that time (0.5mg/kg PO q12h). Target HR is 140-160bpm in hospital with a conversion to sinus rhythm. Up-titrate diltiazem to effect. If difficult to control, can also consider digoxin (0.005mg/kg PO q12h with close monitoring of blood dig levels) due to synergistic effect with diltiazem.

Monitor renal values/BP/HR every 3-4 months lifelong.

A recheck echocardiogram is recommended in 4-6 months to screen for progression.

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