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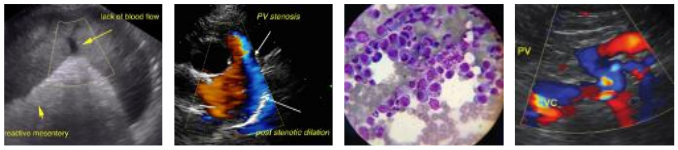

PATIENT
Domino Schweitzer

SPECIES
Canine

BREED
Boxer

SEX
Male Neutered

AGE
12 years

WEIGHT
79.2lbs

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

IMAGING PERFORMED BY
Jessica Bailes

HOSPITAL NAME
All Creatures Great & Small Veterinary Clinic

REFERRING VET
Dr. Vaughn

INVOICE
25136

DATE
7/5/22

PRESENTING CLINICAL SIGNS
History: Examined 6/16/22 for evaluation of worsening cough over the last 2-3 weeks.
-Current medications: Started on furosemide, vetmedin - symptoms have improved.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.
Mild cardiomegaly, equivocal for 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, 20mm/mV. Significant motion artifact throughout. The underlying rhythm appears sinus in origin with low voltage complexes. The average sinus heart rate is 150bpm. Isolated VPCs are seen throughout; primary singles with occasional couplets, polymorphism noted. No supraventricular premature beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with maglinant ventricular arrythmias.

ECHOCARDIOGRAM FINDINGS
2D, m-mode, color flow and doppler imaging is available. Significant left ventricular dilation with decreased systolic function and increased sphericity. Decreased LV wall thickness. Severe left atrial enlargement. The mitral valve appears mildly thickened, with no obvious prolapse into the left atrial lumen. Mild central mitral regurgitation. Normal velocity. Tricuspid valve appears normal in form and function. Moderate right atrial and ventricular dilation. No significant tricuspid regurgitation. The aortic valve is normal in morphology and mobility. Normal LVOT and RVOT velocities. 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	4.9	NA	2.3	2.5	8	15	1.3
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	1.7	1.3	35.9	3.9	5.2	4.8
*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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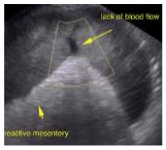
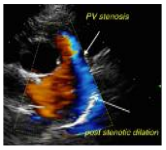
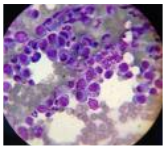
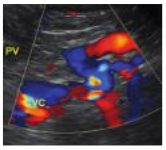

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately, this patient has significant cardiomyopathy and systolic dysfunction. This is causing dilation and volume overload of both the left and right heart. Mild MR is noted, which is suspected to be secondary to annular stretch; early CVD cannot be ruled out. Regardless, the severity of dysfunction and pump failure is significant, and the patient is at high risk for decompensating into congestive failure. 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, thyroid disease, or infiltrative disease such as lymphoma. In a predisposed breed like a boxer, familial disease is suspected until proven otherwise. Consider testing for primary 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.). Regardless of cause, prognosis is 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.

A diuretic response to a cough in addition to the chest radiographs are consistent with CHF, and immediate institution of full cardiac supportive medications is recommended as below. If the breathing worsens or the patient appears unstable, consider hospitalization for stabilization.
As a complicating factor, there is also a significant amount of ventricular ectopy (VPCs) present on the ECG with frequent couplets and polymorphic beats. VPCs are a common finding with DCM. Electing to treat arrhythmias is based upon clinical signs and amount/degree of arrhythmia identified. Unfortunately, there is always an elevated risk for collapse and sudden death in any arrhythmic patient, and even on medications this risk unfortunately still persists.

Based strictly upon the amount of arrhythmia present on the available ECG and the markers of malignancy (couplets/polymorphism), anti-arrhythmic therapy is clearly indicated. Given concurrent structural disease, recommend mexiletine as below.

Elective anesthesia is not advised due to exceedingly high risk for complications.

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:

Baseline BP recommended. Institute Mexiletine 5-7mg/kg PO q8 hour (available in 150 and 250mg capsules). Initiate aldosterone antagonist Spironolactone 1-2mg/kg PO q12h. Institute furosemide 1-2mg/kg PO q12h. Institute Pimobendan 0.3mg/kg PO q12h. Institute taurine 1000mg PO q12h. Diet history, thyroid level, etc. as discussed.

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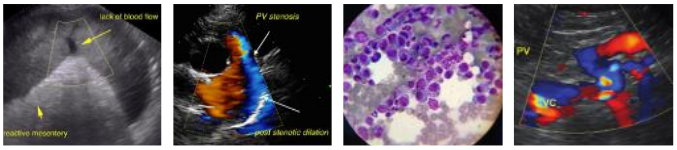

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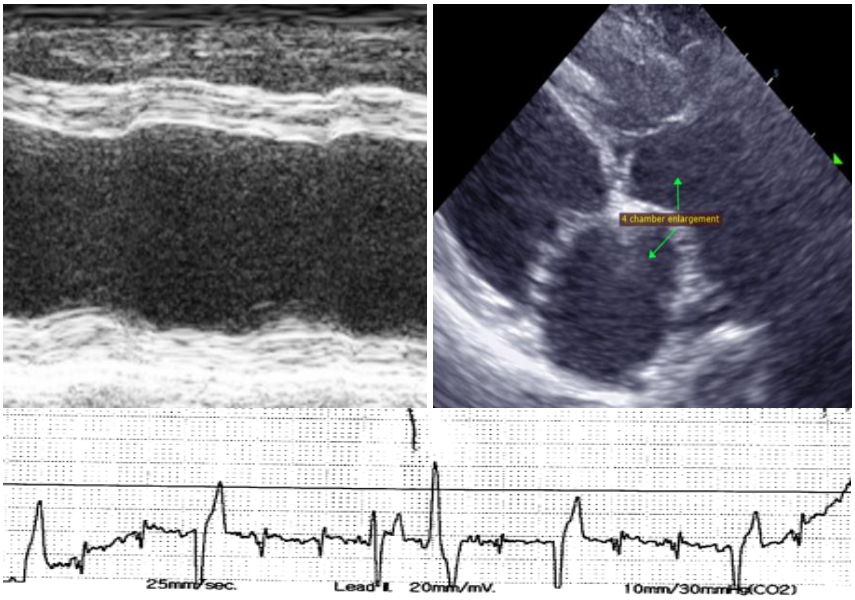
Monitor a renal panel, ECG and blood pressure in 1-2 weeks to ensure tolerance. If BP >130mmHg, institute ACEI 0.5mg/kg PO q12h. Reassessing the ECG is advised to assess need for ancillary anti-arrhythmics. A holter is the gold standard at this time.

A recheck echocardiogram is 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. 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)
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