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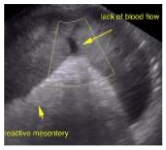
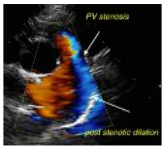
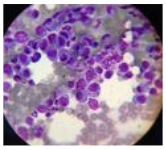
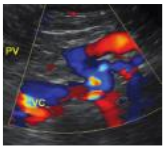
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™

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1-800-838-4268 info@sonopath.com

PATIENT
Tobias Orosz

SPECIES
Canine

BREED
Hound Mix

SEX
Male Neutered

AGE
10.5 years

WEIGHT
51.1lbs

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

IMAGING PERFORMED BY
Jessica Miller

HOSPITAL NAME
Legacy Animal Hospital

REFERRING VET
Dr. Potenzone

INVOICE
23106

DATE
3/15/22

PRESENTING CLINICAL SIGNS

History: Bicavitary effusion on radiographs. History of Addison's disease.
-Current medications: Percortin, 2 doses Lasix 25mg, 5mg Pred, Doxy 200mg BID.
Abnormal PE/Chem/CBC/UA Results: Alb 1.6, HCT 35, MCH 20, mono 1.2 (Kidneys/liver WNL).

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The left ventricular is normal in diastole with an increased systolic dimension. Diminished systolic function. Moderate left atrial enlargement. The mitral valve appears thickened with lack of coaptation in systole. Severe central mitral regurgitation. Decreased MR velocity. Decreased LV wall thickness. The tricuspid valve appears normal in form and function. Mild right atrial and ventricular dilation. Moderate tricuspid regurgitation. Normal TR velocity. The aortic valve is normal in morphology and mobility. No subvalvular ridge present; normal LVOT velocity. No aortic insufficiency. Normal pulmonic valve with no pulmonic insufficiency seen. No pericardial or pleural effusion noted. Ascites seen on subcostal views. No obvious cardiac tumors. **Rapid irregular rhythm throughout.**

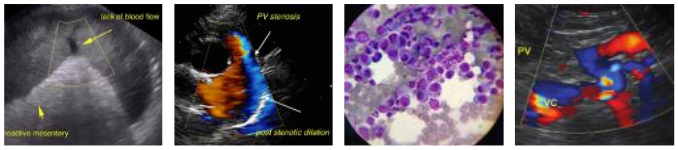
CARDIAC CHART

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	5.2	2.2	1.5	1.5	12	20	0.6
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	250	1.3	0.86	23.2	3.0	4.1	3.6
*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

Unfortunately, this patient has severe biventricular myocardial failure. There is dilation and overload of all 4 chambers resulting in insufficiency of the mitral and tricuspid valves. A primary valvular issue with secondary dysfunction cannot be ruled out, given the degree of MR and TR. Regardless, the degree of dilation and pump failure is resulting in a rapid irregular tachycardia (suspect AF; intermittent VT cannot be ruled out) and right-sided congestive heart failure. **Right heart congestion (peritoneal and pleural effusion noted) is likely secondary to the arrhythmia (causing tachycardia-induced cardiomyopathy typically leads to right-sided congestive signs),**



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while the structural disease itself puts the patient at risk for left-sided congestion (pulmonary edema).

The importance of a screening ECG cannot be stressed enough in order to definitively diagnose the arrhythmia. Without treatment we will not be able to get the congestion controlled despite diuretic therapy. If atrial fibrillation (AF) is confirmed, rate control must be instituted in order to get the rate and secondary congestion under control (typically using Diltiazem +/- Digoxin). If ventricular in origin, sotalol or mexiletine may be necessary. If this is not possible, referral to a tertiary facility should be offered for further evaluation ASAP.

Systolic failure can be primary in nature (DCM) or secondary to taurine deficiency, myocarditis, hypothyroidism, tachycardia-induced cardiomyopathy, or infiltrative disease such as lymphoma. While primary disease is certainly possible in this breed, 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 <6mo for canine patients with active congestion on medications, however they generally are able to maintain a good quality of life for that period. Even with diet-related dysfunction, improvement will likely be minimal at this end-stage phase of disease.

Immediate initiation of full cardiac supportive medications is recommended as below. Emergency hospitalization for supportive care, O2 support and potentially IV rate control is recommended. Cases of systolic failure are at high risk for malignant tachyarrhythmias (such as AF or VT), and activity restriction is advised. Patient will always be at risk for recurrent CHF, development of arrhythmias/LA tear, syncope and/or sudden death in the future.

Monitor for development of a cough, worsening labored breathing, 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

An ECG should be performed ASAP due to the rapid irregular heart rate noted during the study in order to dictate anti-arrhythmic therapy. If this is not possible in your facility, immediate referral is advised. Consider hospitalization for IV diuretic/rate control therapy if needed/indicated. Initiate diuretic furosemide 1-2mg/kg PO q8h if unstable; wean to q12h once breathing normally (2-3 days). Initiate aldosterone antagonist Spironolactone 1-2mg/kg PO q12h. Initiate Pimobendan 0.3mg/kg PO q12h. Institute taurine 1000mg PO q12h. Consider thoraco/abdominocentesis as needed for patient comfort/stability. Consider diet, thyroid status as discussed.

Once HR is controlled, a recheck renal panel, heart rate/BP is recommended in 5-7 days. If doing well and BP >130mmHg at this time, institute ACEI 0.5mg/kg PO q12h.

Recheck echocardiogram and ECG in 4-6 months to reassess cardiac function.

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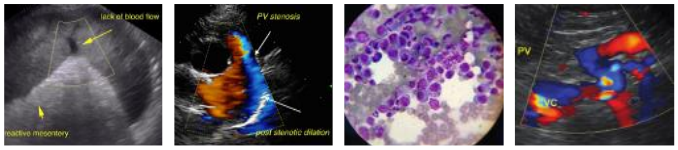

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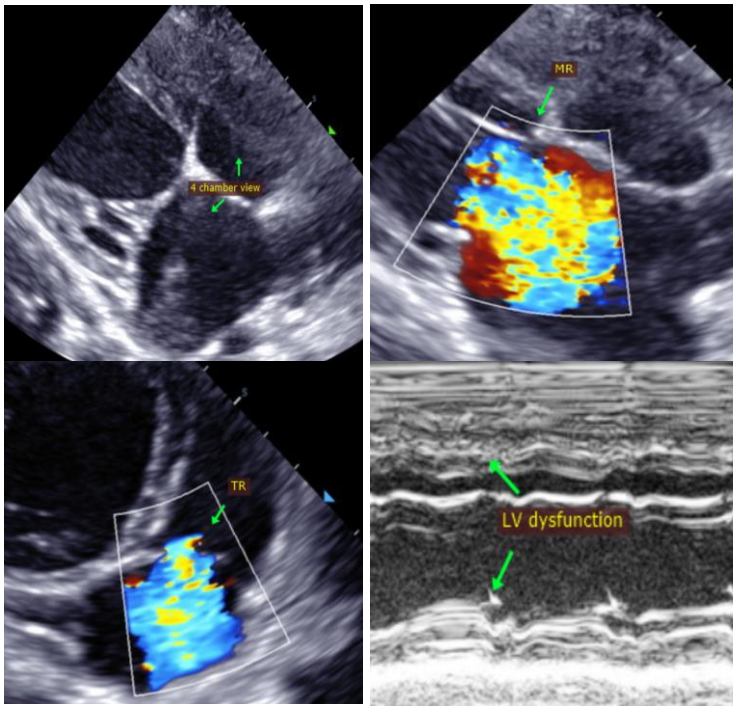
IMAGES



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
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