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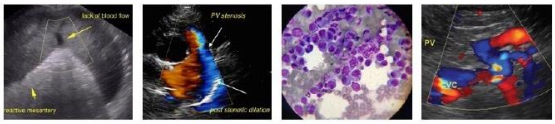

THE FOCAL ZONE
IMAGING PERFORMED BY
289-808-2608 info@thefocalzone.com

PATIENT
Coconut Nichols

SPECIES
Canine

BREED
Boxer

SEX
Female Intact

AGE
4 years

WEIGHT
49.6lbs

INTERPRETED BY
Maggie Machen Lamy, DVM DACVIM (Cardiology)

IMAGING PERFORMED BY
Crystal Hill, RVT

HOSPITAL NAME
Oxford County Vet Clinic

REFERRING VET
Dr. Bowcott

INVOICE
29040

DATE
2/16/23

PRESENTING CLINICAL SIGNS

History: Presented for vaccines 1 month ago, developed kennel cough like symptoms 2 weeks after vaccines and was treated with antibiotics and Benadryl as needed. A new arrythmia was noted at this time that was not present 2 weeks prior. Patient was then being babysat by family as owners were on vacation and upon return owner noted extreme weight loss and severely distended abdomen with ascites. Drained fluid yesterday and started Furosemide and Atenolol.

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. The average heart rate is 140bpm (range 115-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. A single VPC is identified. No couplets, triplets or VT are appreciated. No supraventricular premature beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with a single VPC.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Severe left ventricular dilation with diminished systolic function. Decreased LV wall thickness with increased sphericity. Marked left atrial enlargement. The mitral valve appears normal in form and function, with no obvious prolapse into the left atrial lumen. Mild mitral and moderate tricuspid regurgitation secondary to annular stretch. Severe right atrial and ventricular dilation. The aortic valve is normal in morphology and mobility. No subvalvular ridge present; mildly increased 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.

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	2.0	2.0	2.5	8	17	1.2
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	150	2.5	0.8	22.5	3.8	5.0	4.6
*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 *Note: All measurements based upon multi-modal images and methods. An average value is reported.* Adapted from June Boon, Veterinary Echocardiography, 1998 Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435				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)

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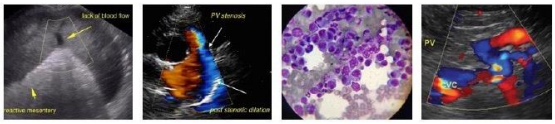

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Hansson et al, Vet Rad and Ultrasound 2002 Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995	35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
	40	2.62 (5.2)	5.48 (6.1)	3.96 (5.4)
	50	2.88 (7.1)	6.07 (8.3)	4.46 (7.4)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately, this patient has severe biventricular myocardial failure. This is causing dilation and overload of all 4 chambers resulting in insufficiency of the mitral and tricuspid valves. The degree of dilation and pump failure is resulting in tachycardia and right-sided congestive heart failure (ascites). A VPC is noted on the ECG, which may indicate high risk for malignant tachycardia (such as VT). The patient is at exceedingly high risk for rapid atrial fibrillation as well, which can lead to acute worsening of symptoms, and monitoring for associated clinical signs is recommended (collapse, abdominal distention, pleural effusion). No additional issues are identified.

Systolic failure can be primary in nature (DCM) or develop secondary to diet, myocarditis, tachycardia-induced cardiomyopathy, or infiltrative disease such as lymphoma. In a relatively young boxer, a primary genetic DCM is certainly possible; however, other possibilities should be ruled out, A thorough diet history is recommended, screening of nontraditional options. Additionally a taurine level can be submitted; however, regardless of results recommend a taurine supplement in this case as below. Finally, a thorough medical history to assess for prior issues such as parvo virus, Chagas disease, etc. is recommended. A cardiac troponin level can be submitted to assess for ongoing damage of the myocardium as well.

Regardless of cause, prognosis is poor at this stage in the disease process, with an average survival time of <6mo, 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. **Atenolol should be avoided in cases of acute congestive heart failure and must be discontinued due to a drop in cardiac output.** No treatment is indicated for the arrythmia based upon what is seen here; however, a holter monitor is recommended once stable. Depending on clinical stability, consider referral for overnight hospitalization, supportive care and ECG monitoring. 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

Consider referral for hospitalization as discussed. Administer Lasix 1-2mg/kg PO q12h. Discontinue Atenolol ASAP. Initiate Pimobendan 0.3mg/kg PO q12h. Initiate aldosterone antagonist Spironolactone 1-2mg/kg PO q12h. Diet/thyroid status, etc. Supplement taurine 1000mg PO q12h.

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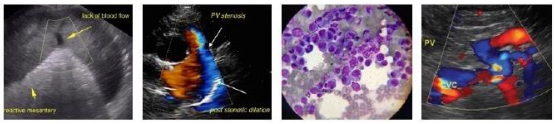

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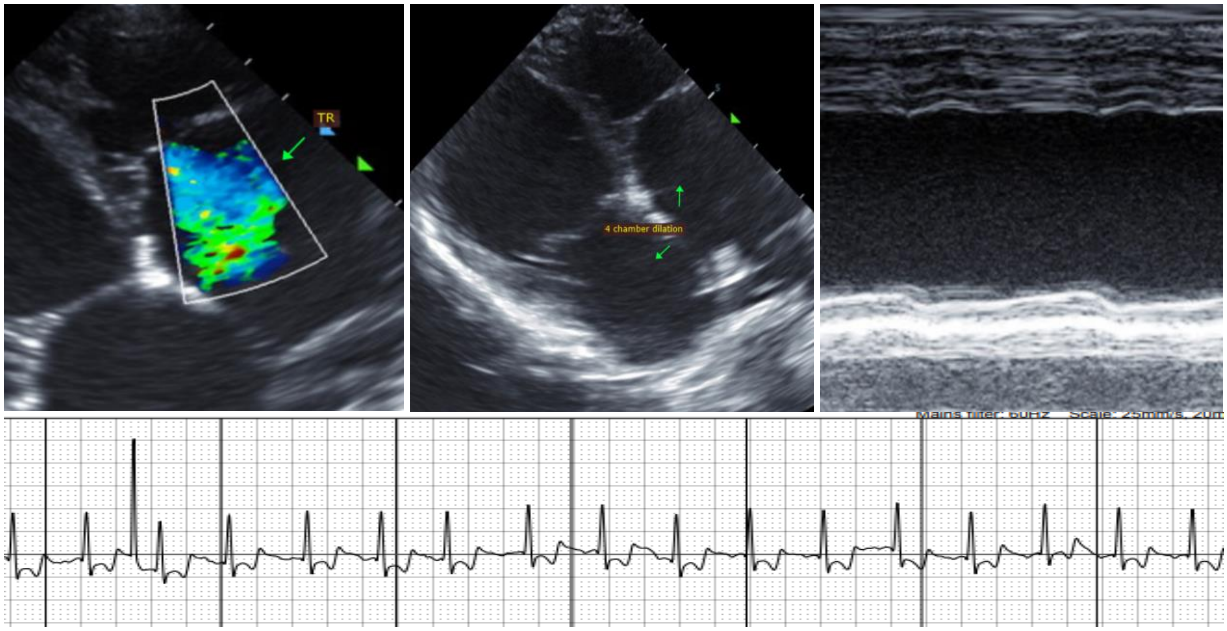
Recheck renal panel, heart rate, BP in 5-7 days. Consider taurine level/cTnI as discussed above. If doing well and BP >130mmHg, institute low dose ACEI 0.5mg/kg PO q24h.

Once the patient is stable, a repeat ECG or ideally a holter monitor is recommended in 2-4 weeks.

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

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