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Clinical Sonography & Telecytology
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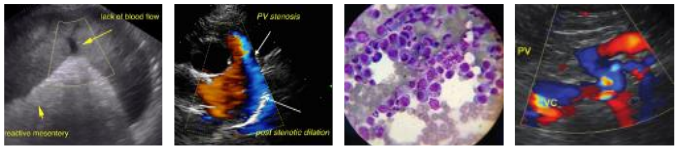


PATIENT
Oliver2 Ingram

SPECIES
Canine

BREED
Miniature Schnauzer

SEX
Male Neutered

AGE
11 years

WEIGHT
23.6lbs

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

IMAGING PERFORMED BY
Mark van Campen, DVM

HOSPITAL NAME
Mississippi Hills Animal Hospital

REFERRING VET
Dr. van Campen

INVOICE
28639

DATE
1/31/23

PRESENTING CLINICAL SIGNS

History: 2 weeks ago, at annual exam grade III heart murmur and cough detected. Started vetmedin 2.5mg q12h - improved clinically. Gave trazodone and gabapentin for sedation pre-echo. Appeared to decompensate overnight. Coughing increased, nasal drip, increase resp rate, very harsh lung sounds. Chest xray: Pulmonary edema, pleural effusion. Rhythm abnormally slow. Presented for echo and work up this AM. Started furosemide 3mg per kg IM.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.

Significant cardiomegaly with evidence of CHF.

ELECTROCARDIOGRAPHIC FINDINGS

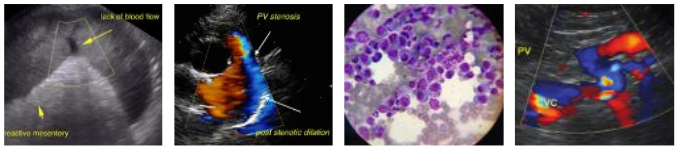
A six lead ECG is available at 25mm/s; 10mm/mV. The average heart rate is 130bpm (range 100-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P wave morphology is positive with a normal dimension. Normal PR. The QRS morphology is positive with normal dimension. MEA is normal. Isolated APCs are identified; two in a brief tracing. No ventricular premature beats, pauses or other dysrhythmias observed.
ECG diagnosis: Respiratory sinus arrythmia with isolated APCs.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. Severe eccentric mitral regurgitation with marked left atrial dilation. Normal MR velocity. Mild LV dilation with hyperdynamic myocardial function. The tricuspid valve appears mildly thickened with mild TR. Normal right atrial and ventricular diameter and morphology. The pulmonic and aortic valves are normal in morphology and mobility. Normal aortic and pulmonic outflow velocities with laminar flow. No AI/PI. No pericardial or pleural effusion noted. No obvious cardiac masses.

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	NM	NM	2.8	50	90	NM
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	1.6	1.3	10.7	3.6	3.8	1.9
*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 Hansson et al, Vet Rad and Ultrasound 2002				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)



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Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995	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

The cause of the murmur is chronic degenerative valve disease causing severe mitral and mild tricuspid regurgitation. Marked left atrial enlargement indicates the risk for spontaneous congestive heart failure is elevated. No additional issues are identified.

The ECG does show occasional APCs, which are seen throughout the echocardiogram as well. APCs are no doubt secondary to atrial dilation and stress in this case. No treatment is warranted based upon what is seen here. It is also worth mentioning that the resting heart rate is relatively low for a patient in crisis. If the anti-anxiety medications are still on board, this would be the simple explanation; however, in this predisposed breed an underlying issue such as sick sinus syndrome is a possibility. There is some risk in attempting heart rate stimulation given concurrent tachyarrhythmias and simple follow up is recommended at this time. If the patient experiences any collapse episodes in the future, highly recommend referral to a local Cardiologist for advanced evaluation.

Given these findings, the diagnosis is congestive heart failure and medications are warranted lifelong as below. Correlation with anti-anxiety medications is considered coincidental as these are typically cardio-protective (stress being the much more harmful exacerbant).

Monitoring of sleeping respiratory rates will be paramount to screen for congestive heart failure at home. Cough suppression to improve QOL can also be considered (hydrocodone, 0.2-0.4mg/kg up to q4-6h PRN) for any residual mechanical cough in the face of normal sleeping respiratory rates. The average survival time of canine patients with active pulmonary edema is 8-9 months on medications, however they generally are able to maintain a good quality of life for that period. Patient will always be at risk for recurrent CHF, development of arrhythmias/LA tear, syncope and/or sudden death in the future.

Omega fatty acid supplementation and mild salt restriction may also be of some long term benefit. Monitor for acute progression of the cough, labored breathing, exercise intolerance or collapse episodes in the future.

PLAN

Institute Pimobendan 0.3mg/kg PO q12h. Institute Furosemide 1-2mg/kg PO q12h. Institute spironolactone 1-2mg/kg PO q12h.

Monitor SRRs at home. Monitor renal values and BP in 10-14 days, then every 3-4 months while on diuretics. If doing well and BP >130mmHg, institute ACEI 0.5mg/kg PO q12h. Consider hydrocodone if needed for QOL. Brief HR reassessment suggested at this visit with an ECG if needed. If any syncope occurs and/or the resting heart rate declines, referral to a local Cardiologist is recommended.

Recommend conservative monitoring with a recheck echocardiogram in 6 months, sooner if any development of associated clinical signs occurs in the interim.

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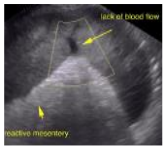
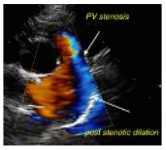
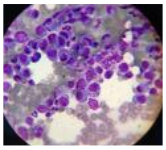
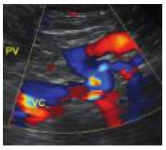

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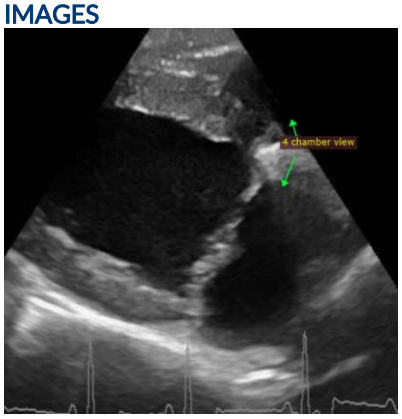
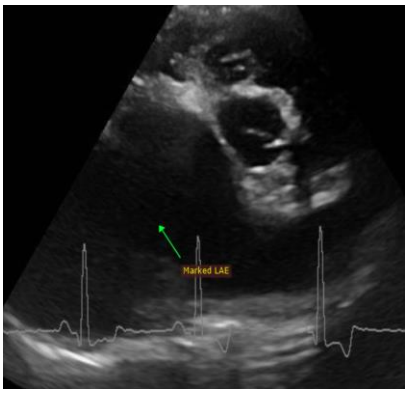
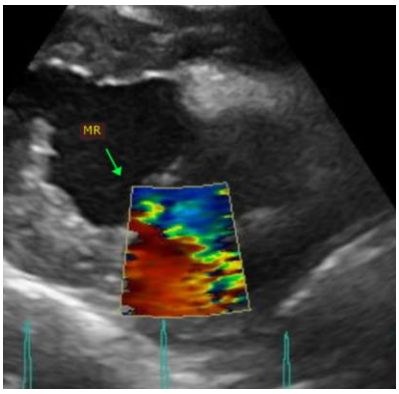
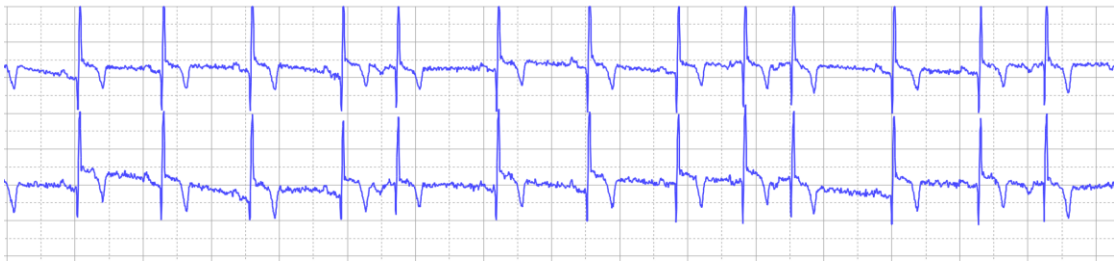
IMAGES









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
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)
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