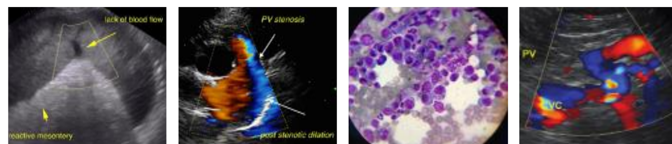
SonoPath
Clinical Sonography & Telecytology

EDUCATIONAL TELECONSULTATION SERVICES™



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

PATIENT
Lulu Knight

SPECIES
Canine

BREED
Boston Terrier

SEX
Female Spayed

AGE
11 years

WEIGHT
25lbs

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

IMAGING PERFORMED BY
Dana Alterman, RDCS, LVT

HOSPITAL NAME
Eubank Animal Clinic

REFERRING VET
Dr. Gardner

INVOICE
30654

DATE
5/8/23

PRESENTING CLINICAL SIGNS

History: Presented for CHF one week ago. Murmur. Dyspnea. Pulmonary Edema. Treated with 02, furosemide and vetmedin. Responded moderately. Has ascites. Has enlarged liver/congestion.
-Current medications: Vetmedin and Furosemide.

ELECTROCARDIOGRAPHIC FINDINGS

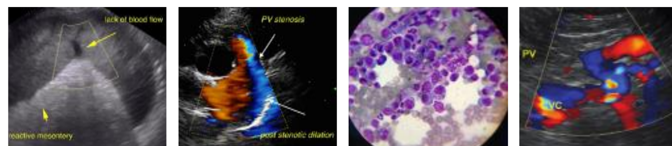
A six lead ECG is available at 25mm/s; 10mm/mV. The underlying rhythm is sinus in origin with an average heart rate of 150bpm. The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P wave morphology is positive with a normal dimension. Normal PR. The QRS is isoelectric. MEA is shifted right. Frequent accelerated idioventricular rhythm appreciated with a slightly increased heart rate of 155bpm. No true VPCs, APCs or other dysrhythmias are observed.
ECG diagnosis: Normal sinus rhythm with frequent AIVR.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets with prolapse into the left atrial lumen. Severe eccentric mitral regurgitation with severe left atrial dilation. A small hyperechoic lesion is seen (1.0 x 0.8cm) within the lumen, with adherence to the roof of the left atrium. A stalk is seen in some views, although inconsistent. The mass is freely movable yet tethered in appearance. Normal MR velocity. Mild LV dilation with hyperdynamic myocardial function. The tricuspid valve appears normal, with mild TR. Velocity consistent with early pulmonary hypertension. 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	5.0	3.2	NM	2.5	39	59	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	1.1	0.5	11.3	4.0	4.3	2.6
*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)
Adapted from June Boon, Veterinary Echocardiography, 1998				20	2.02 (1.9)	4.14 (2.2)	2.80 (2.0)
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
Hansson et al, Vet Rad and Ultrasound 2002				30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
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)



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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The cause of the murmur is chronic degenerative valve disease causing severe mitral and mild tricuspid regurgitation. Severe left atrial enlargement indicates the risk for spontaneous congestive heart failure is elevated. Early pulmonary hypertension is noted, which is likely secondary to chronic LA pressure elevation. Finally, a small hyperechoic lesion is identified within the left atrial lumen. The lesion appears adhered to the wall with suspicion for a stalk-like attachment. This is extremely unusual to see in small animal and likely reflects a small mass. A blood clot cannot be entirely ruled out, although this is extremely unlikely in dogs with atrial enlargement. Simple follow up is advised; however, this may be contributing to arrythmia formation. No additional issues are identified.

The ECG is consistent with an accelerated idioventricular rhythm (AIVR). No evidence of true ventricular tachycardia is seen here, nor are VPCs identified. AIVR is similar to VT in appearance as it is also generated from the ventricle, however the rate is significantly slower and there is typically no hemodynamic compromise (normal BP, no clinical signs). The term 'accelerated' is used as a comparison to the sinus rate (in this case sinus rate is 150bpm while AIVR rate is accelerated at 155bpm). VT is a malignant, highly unstable rhythm with a HR>180-200bpm consistently and accompanies weakness, lethargy/collapse, poor peripheral pulses and hypotension. While either rhythm is possible with structural disease and potential intracardiac neoplasia, AIVR does not require therapy and does not typically lead to VT. AIVR typically develops due to extra-cardiac causes and in this case is likely due to the splenic tumor. No anti-arrhythmic medications are advised at this time. ECG reassessment is advised should any syncope be noted in the future.

In light of the clinical signs, chest radiograph findings and severity of disease on echocardiogram, the diagnosis is congestive heart failure and full cardiac support is warranted lifelong as below. This includes addition of both Spironolactone and low dose Sildenafil due to ascites, even with only mild pulmonary hypertension documented. Plavix is also reasonable in this case, as the presence of the intra-luminal mass may increase risk for clot formation. 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.

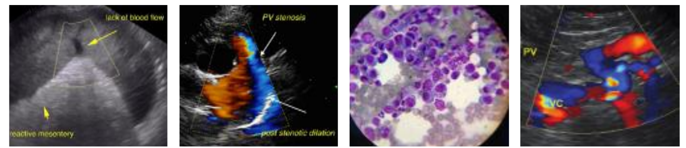
Omega fatty acid supplementation and mild salt restriction may also be of some long-term benefit. Monitor for acute progression of the cough, labored breathing, exercise intolerance or collapse episodes in the future.

Elective anesthesia is not advised, as there is high risk for complication.

PLAN

Administer Pimobendan 0.3mg/kg PO q12h. Administer Lasix 1-2mg/kg PO q12h. Institute spironolactone 1-2mg/kg PO q12h. Institute Sildenafil 1-2mg/kg PO q12h. Institute Plavix 37.5mg PO q24h. Abdominocentesis if needed for comfort/appetite.

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



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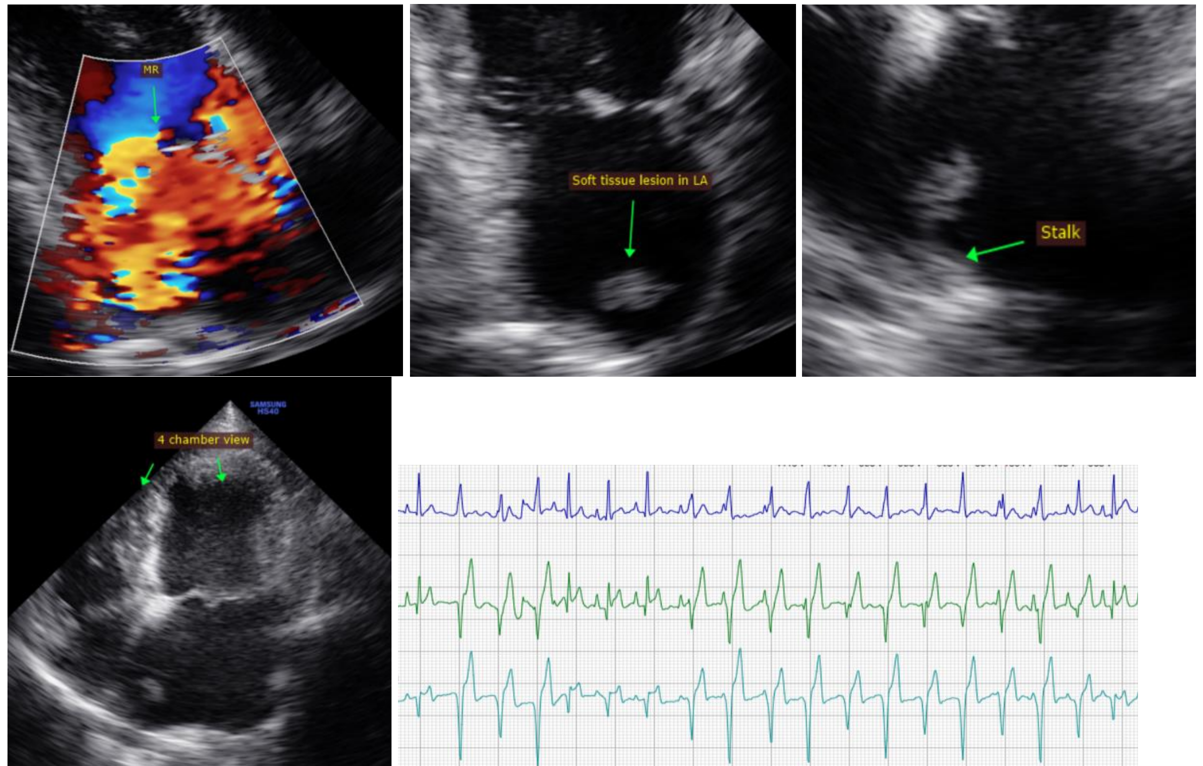
hydrocodone if needed for QOL. If any syncope develops, an immediate ECG reassessment is recommended.

Recommend conservative monitoring with a recheck echocardiogram and ECG in 6 months, sooner if any development of associated clinical signs occurs 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)
info@sonopath.com