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Clinical Sonography & Telecytology
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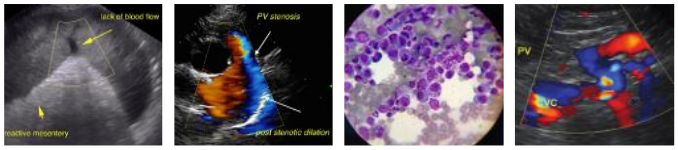

PATIENT
Reilly Clemens

SPECIES
Canine

BREED
Soft Coated Wheaten Terrier

SEX
Male Neutered

AGE
11 years

WEIGHT
54lbs

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

IMAGING PERFORMED BY
Jennifer Todd, DVM

HOSPITAL NAME
Lambs Gap Animal Hospital

REFERRING VET
Dr. Todd

INVOICE
20399

DATE
8/6/21

PRESENTING CLINICAL SIGNS

History: Grade I/VI systolic heart murmur. CBC, Chemistry, T4 and 4DX were normal. ProBNP was elevated at 4041. BP: 1274/72, 133/73, 130/66mmHg.

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, 10mm/mV. The average heart rate is 110bpm. The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. Isolated VPCs throughout; singles only. No supraventricular premature beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with respiratory variation. Isolated VPCs.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The mitral valve is diffusely thickened with mild prolapse into the left atrial lumen. There is moderate to severe eccentric mitral regurgitation present. The MR velocity is normal. There is moderate to severe left atrial enlargement. There is mild left ventricular dilation. Left ventricular systolic function is adequate. No right atrial or ventricular dilation (subjective). Mild thickening of the tricuspid valve with mild TR. There is normal systolic flow velocity across the aortic valve. The aortic valve appears trileaflet with normal mobility. The main pulmonary artery is normal in diameter. The pulmonic valve is normal in appearance. No pericardial/pleural effusion or cardiac masses are seen.

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	5.1	NM	1.8	1.9	36	66	0.8
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	1.2	0.7	24.5	4.2	5.0	3.2
*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)
Adapted from June Boon, Veterinary Echocardiography, 1998				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435				30	2.33 (3.3)	4.83 (3.9)	3.39 (3.4)
Hansson et al, Vet Rad and Ultrasound 2002				35	2.48 (4.3)	5.17 (5.0)	3.69 (4.5)
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)

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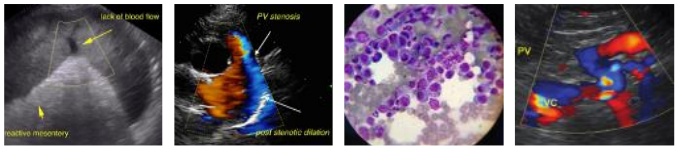

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Chronic degenerative valve disease causing severe mitral and mild tricuspid regurgitation. The LA is significantly dilated indicating a high risk for clinical signs going forward. No additional concurrent issues such as systolic dysfunction are documented.

With this degree of left heart changes (and development of VPCs), there is concern for progressive disease and cardiac supportive medications are indicated as below. A weak diuretic (spironolactone) is included given risk for decompensation in the future even with no reported symptoms. Assessment of progression in the future will help predict long term outcome, however prognosis is guarded at this stage (late B2). Unfortunately, the patient will always be at risk for recurrent CHF, development of arrhythmias/LA tear, syncope and/or sudden death in the future.

The ECG does confirm the cause of the arrhythmia is isolated VPCs. VPCs are generated from abnormal conductive or fibrotic tissue in cardiac tissue, and even frequent single ectopy will often cause no clinical signs in dogs. When sustained however, ventricular tachycardia can lead to symptoms such as lethargy and collapse. VPCs can be primary in origin (i.e., due to a conduction disease such as ARVC) or develop secondary to significant structural cardiac disease or be extra-cardiac in origin (i.e., due to pain, stress, neoplasia, GI disease, etc.). In this dog with significant CVD, my suspicion is they are due to a combination of structural disease and stress. Ruling out additional systemic issues is also recommended that as a contributing factor.

Deciding to treat VPCs is based upon many factors, including frequency and markers of malignancy (polymorphism, couplets, etc.). Given only single monomorphic VPCs, no treatment is clearly indicated. Ideally a holter would be performed once the patient is stabilized on medications, to determine the true extent of the arrhythmia. An alternative approach would be to simply monitor going forward for any associated clinical signs (such as acute lethargy or collapse).

Close monitoring for development of associated clinical signs (development of a cough, labored breathing, exercise intolerance or worsening collapse episodes) is recommended. Monitoring of sleeping breathing rates is recommended as the best way to screen for CHF at home.

Elective anesthesia is not advised, as there is high risk for complication. If necessary, cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction, iso or sevoflurane gas) are recommended. Pre-oxygenate for 5-10 minutes prior to induction and recover in O2 cage. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Moderate IV fluid restriction is recommended to avoid fluid overload. Avoid heart rate stimulating drugs such as atropine unless clinically indicated.

Omega fatty acid supplementation and mild salt restriction may also be of some long-term benefit.

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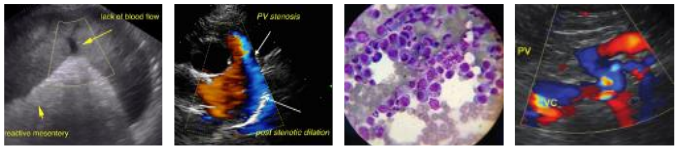

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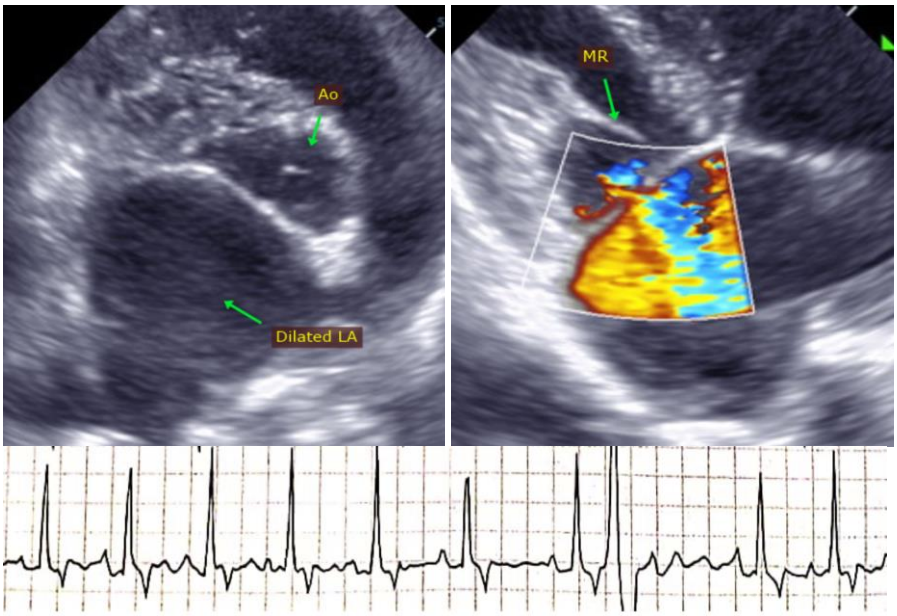
PLAN

A screening BP is recommended. Administer Pimobendan 0.3mg/kg PO q12h. Institute ACE-I (benazepril or enalapril) 0.5mg/kg PO q12h. Institute spironolactone 1-2mg/kg PO q12h.

Monitor renal values in 1-2 weeks, then every 3-4 months lifelong to ensure tolerance of medications. If the arrhythmia persists, consider a holter v monitor as discussed.

A recheck echocardiogram is recommended in 4-6 months to screen for progression, sooner if clinical signs arise.

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