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Clinical Sonography & Telecytology
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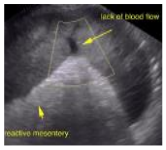
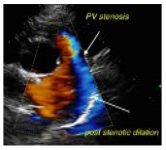
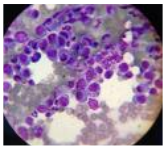
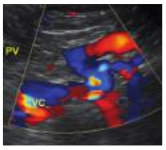

SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT
Ella Lewis

SPECIES
Canine

BREED
Border Collie Mix

SEX
Female

AGE
16 months

WEIGHT
48.9lbs

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
22539

DATE
2/14/22

PRESENTING CLINICAL SIGNS

History: Significant arrhythmia noted. Irregular with pulse deficits. No murmurs audible.

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 120bpm. The P wave morphology is positive with a normal dimension. Normal PR. The QRS morphology is positive with normal dimension. Frequent isolated VPCs throughout with brief period of bigeminy. The coupling interval is inconsistent. The VPCs appear monomorphic with a RBBB morphology (indicative of LV origin). No couplets, triplets or runs appreciated. No supraventricular beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with frequent VPCs.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Normal mitral valve leaflets with no prolapse into the left atrial lumen. No obvious mitral regurgitation with a normal left atrial dimension. Normal LV diameter with adequate myocardial function. The tricuspid valve appears normal with trace tricuspid regurgitation. Normal velocity. Normal right atrial and ventricular diameter and morphology indicating no overt evidence of pulmonary arterial hypertension. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No obvious aortic and trivial pulmonic insufficiency. 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	NA	NA	NM	NM	58	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	1.8	1.0	22.2	NM	3.6	1.5
*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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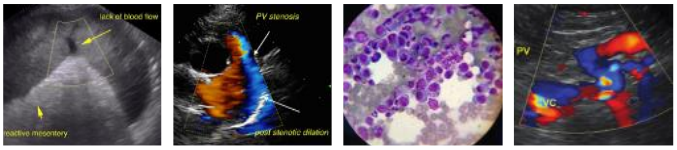

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Overtly normal cardiac dimensions and function, with no obvious dysfunction or dilation of the left heart. No significant valvular leaks are visualized, and no evidence of pulmonary hypertension. No obvious congenital defects are seen and in the absence of a murmur are considered unlikely.

The ECG does confirm the arrhythmia is due to single ventricular premature contractions (VPCs). The abnormal beats are monomorphic and are only seen as single beats (i.e., no couplets, runs, etc.). VPCs are ectopic beats generated from abnormal conductive or fibrotic tissue in the ventricles of the heart muscle, and even frequent single VPCs will often cause no clinical signs in dogs. When sustained however, ventricular tachycardia can lead to symptoms such as lethargy and collapse.

VPCs are a very non-specific finding. They can be primary in origin (conduction disease), develop secondary to significant cardiac disease (not present in this study) or be extra-cardiac in origin, i.e., due to pain, stress, inflammation, cancer, GI disease, DIC/sepsis, etc. In a 1-year-old dog without systemic illness or structural cardiac disease, **a primary conduction issue is suspected.** This is extremely uncommon and referral to a local Cardiologist should certainly be considered. A syndrome called Inherited Ventricular Arrhythmias of German Shepherd Dogs (IVAGSD), can be seen specific to the GSD breed; however, I suppose something similar is a possibility. Full systemic evaluation can be considered; however, in a young otherwise healthy animal this is likely of low yield.

With no clinical signs and only isolated beats, anti-arrhythmic therapy is not clearly warranted at this time. If referral is declined, highly recommend a holter as the next step to allow monitoring of the rhythm throughout 24 hours of a normal day to ensure anti-arrhythmics are not warranted (can be ordered through Sonopath).

Unfortunately, regardless of cause there is always an elevated risk for collapse and sudden death in any arrhythmic patient, and even on medications this risk unfortunately still persists. Mild activity restriction is advised lifelong. Monitor at home for collapse, exercise intolerance, and/or lethargy.

Anesthesia is not advised until the patient is further evaluated.

PLAN

Consider thorough systemic evaluation. Consider referral to a local Cardiologist for advanced EP assessment. If declined, consider a holter monitor.

Recheck ECG in 3 months or pending holter results, sooner if any clinical signs arise.

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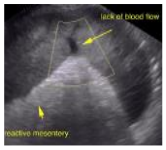
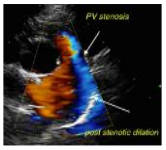
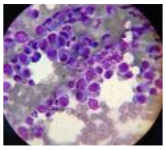
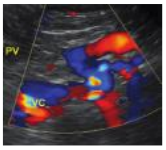

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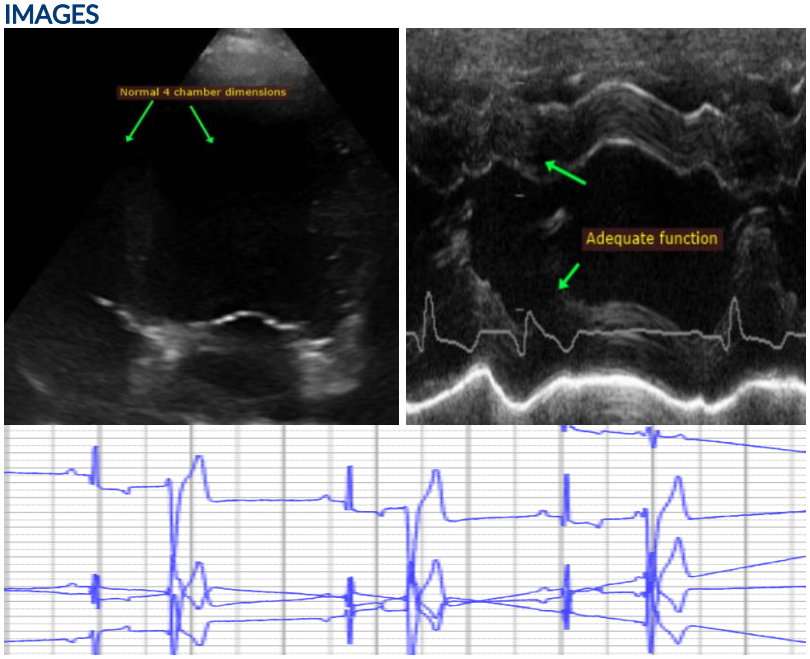
IMAGES



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)
info@sonopath.com