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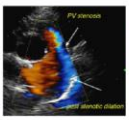
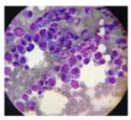
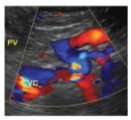

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PATIENT

Chubs McNamara

SPECIES

Canine

BREED

English Bulldog

SEX

Male Neutered

AGE

10 years

WEIGHT

56.4lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Rachel Runnells, RVT

HOSPITAL NAME

SVS Imaging KC

REFERRING VET

Dr. Mervin

INVOICE

23708

DATE

4/15/22

PRESENTING CLINICAL SIGNS

History: Syncopal episode after getting worked up barking at another dog. Did have splenectomy in November. Dx-Hematoma and not hemangiosarcoma.
-Abnormal PE/Chem/CBC/UA Results: Mild non-regenerative anemia, Increased ProBNP at 1213.
-Sedation: Butorphanol.

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

Normal cardiac silhouette. No obvious evidence of CHF.

ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.

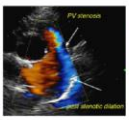
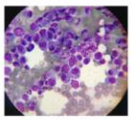
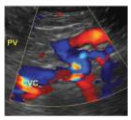
A single lead ECG is available; 25mm/s, 10mm/mV. The average heart rate is 125bpm with a largely regular rhythm. The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. A single isolated VPC is identified. No supraventricular premature beats, 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. The mitral valve appears mildly thickened with no obvious prolapse into the left atrial lumen. There is trace MR present. Normal MR velocity. Normal left atrial dimension. Normal LV diameter with adequate myocardial function. Normal LV wall thickness. The tricuspid valve appears normal in form and function. Normal right atrial and ventricular diameter and morphology indicating no overt evidence of pulmonary arterial hypertension or right heart compensation. No tricuspid regurgitation. The aortic valve is normal in morphology and mobility. No subvalvular ridge present, normal velocity. No aortic insufficiency. Normal pulmonic valve with trivial pulmonic insufficiency seen. No pericardial or pleural effusion noted. 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	5.2	2.6	1.2	1.0	46	78	0.4
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	100	1.6	0.9	25.6	1.9	3.6	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				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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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

Overtly normal cardiac structure and function. Equivocal MR is noted, which is physiologic (i.e., unlikely to progress) at this time. Monitoring for progression is advised going forward, particularly should a murmur develop in the future. Regardless, the amount of abnormality seen on this exam does not definitively explain the recent collapse episode.

The ECG does confirm a single VPC. Ventricular premature contractions (VPCs) are 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 due to significant cardiac disease (not identified in this study) or be extra-cardiac in origin, i.e., due to pain, stress, inflammation, cancer, GI disease, DIC/sepsis, etc. Regardless of cause, there is always an elevated risk for collapse and sudden death in any arrhythmic patient, and even on medications this risk still persists. When VPCs are found, two things should be assessed: why they are occurring (extra-cardiac or primary arrhythmic causes suspected) and if they require therapy. Today's echo findings are not enough to explain the VPCs or collapse episodes described, and other possible causes should also be ruled out. The situational component of the episode may support something as simple as a vaso-vagal event and it may be reasonable to simply monitor at home, unless the episodes continue to reoccur. In this instance, consider further systemic and/or neurologic workup, including an abdominal ultrasound to be thorough. That being said, even with only a single VPC appreciated, it is still possible this patient had arrhythmic syncope (ventricular tachycardia) and a holter monitor can be considered as the next step to allow monitoring of the rhythm throughout 24 hours of a normal day and help determine if treatment is indicated. Discussion with the owner is advised.

Based strictly upon the amount of arrhythmia present on the available ECG (a single abnormality), anti-arrhythmic therapy is not clearly indicated. Fish oil supplementation is recommended for dogs with arrhythmias (1000mg of omega 3 and 6 once to twice daily as tolerated).

Monitor at home for collapse, exercise intolerance, and/or lethargy. If a holter monitor is elected, this will dictate whether therapy is needed for the arrhythmia and follow up protocol. Mild activity restriction is advised.

PLAN

A screening BP is recommended. Consider monitoring versus holter monitor versus further systemic evaluation as discussed.

A recheck echocardiogram is recommended should a murmur or clinical signs of cardiac compromise develop in the future.

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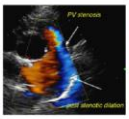
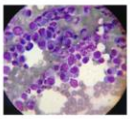
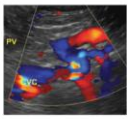

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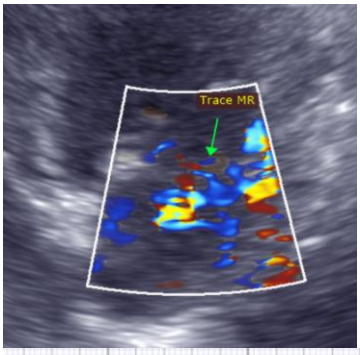

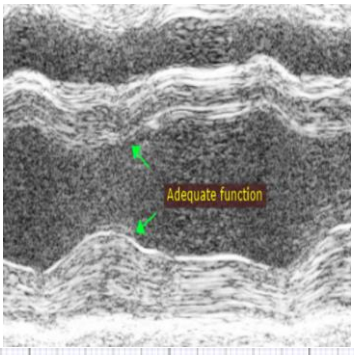

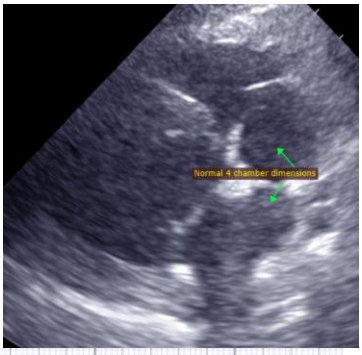

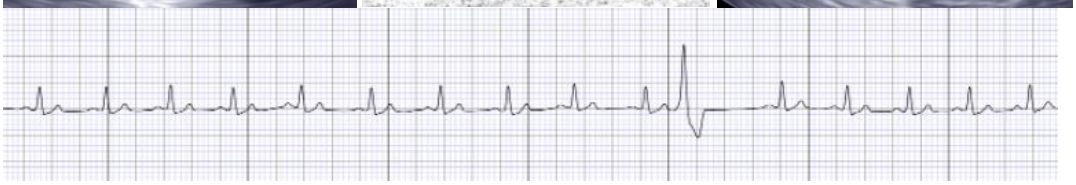

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

Thank you for this referral. 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