



PATIENT

Pretty Girl Lingle

SPECIES

Canine

BREED

Boston Terrier

SEX

Female Spayed

AGE

10 years

WEIGHT

26lbs

INTERPRETED BY

Maggie Machen Lamy,
 DVM, DACVIM
 (Cardiology)

IMAGING PERFORMED BY

Loetitia St-Jacques,
 LVT/RVT

HOSPITAL NAME

Mountain View
 Animal Hospital

REFERRING VET

Dr. Mendoza

INVOICE

32137

DATE

8/3/23

PRESENTING CLINICAL SIGNS

History: Presented on 8/1 for evaluation of 2 episodes of collapse at home. O described them as fainting episodes where the patient quickly and progressively fell down limp and had to be stimulated aggressively by O to recover. On physical evaluation, a marked murmur and asynchronous and alternating strong and weak femoral pulses was noted. Oxygen provided. BP: 120-130mmHg. -Abnormal PE/Chem/CBC/UA Results: Phosphorus 6.5 mg/dL TCO2 (Bicarbonate) 28 mmol/L Platelets 473 K/ μ L Urine Creatinine 88.7 mg/dL Urine Protein 125.2 mg/dL Urine Protein: Creatinine Ratio 1.4.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only. Possible mild right-sided cardiomegaly. No obvious evidence of CHF.

ELECTROCARDIOGRAPHIC FINDINGS

A six lead ECG is available at 50mm/s; 10mm/mV. The average heart rate is 120bpm with largely regular rhythm. 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 low voltage. MEA is normal. VPCs are noted throughout the tracing; primarily singles with occasional couplets (instantaneous heart rate: 250bpm). The VPCs are multiform. No VT or APCS are appreciated. ECG diagnosis: Normal sinus rhythm with single and couplet VPCs.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The mitral valve appears normal in form and function, with no obvious prolapse into the left atrial lumen. Trace MR present. Normal left atrial dimension. Normal LV diameter with adequate myocardial function. Normal LV wall thickness. The tricuspid valve appears normal in form and function. Mild right heart enlargement. Mild right ventricular hypertrophy. Trace tricuspid regurgitation. The MPA and branches are prominent. The aortic valve is normal in morphology and mobility. No subvalvular ridge present, normal velocity. No aortic insufficiency. Normal pulmonic valve with no 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			1.4	1.1	36	70	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	150	1.1	0.6	11.8	1.9	2.5	1.6
*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)
				20	2.02 (1.9)	4.14 (2.2)	2.80 (2.0)



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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)

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The only structural abnormalities identified are trace mitral and tricuspid regurgitation with mild right heart enlargement. Some degree of pulmonary hypertension is suspected, although severe pressure elevation is essentially ruled out. The MPA is prominent yet not significantly dilated and the TR is hemodynamically insignificant. A PTE could be considered as a possible issue in this case, depending on underlying disease processes, etc. The systolic function is intact, and no additional issues are identified.

The ECG does confirm isolated VPCs with some couplets. 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.

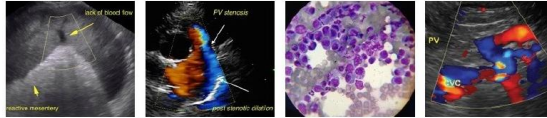
VPCs are a very non-specific finding. They can be due to significant cardiac disease (not identified in this study) or be extra-cardiac in origin; i.e., due to pain, stress, inflammation, cancer, GI disease, DIC/sepsis, etc. Regardless of cause, there is always an elevated risk for collapse and sudden 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 do not entirely explain the VPCs or the episodes described, although pulmonary hypertension must be considered if they persist going forward. What is difficult is the VPCs may be secondary to some neurologic pathology, or may indicate a more malignant arrhythmic issue such as VT. Further systemic and neurologic workup including AUS is advised to be thorough. That being said, even with only single VPCs appreciated, it is still possible this patient had arrhythmogenic syncope (ventricular tachycardia) and a holter monitor is highly recommended as the next step to allow monitoring of the rhythm throughout 24 hours of a normal day and help determine if treatment is indicated. **If this is declined or not possible and no alternative explanation is found, consider use of Sotalol although this is not ideal.** Discussion with the owner is advised.

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

Holter monitor and further systemic evaluation recommended as discussed. A neurologic consultation is reasonable as well. If declined and no alternative explanation is found, consider institute Sotalol 1-2mg/kg PO q12h (compounding will be necessary). If syncope persists despite therapy and is exertional in origin, a trial of Sildenafil can be utilized 1-2mg/kg PO q8h and assess response. If the patient has respiratory signs, a Radiologist review of the films is recommended for a thorough pulmonary evaluation.



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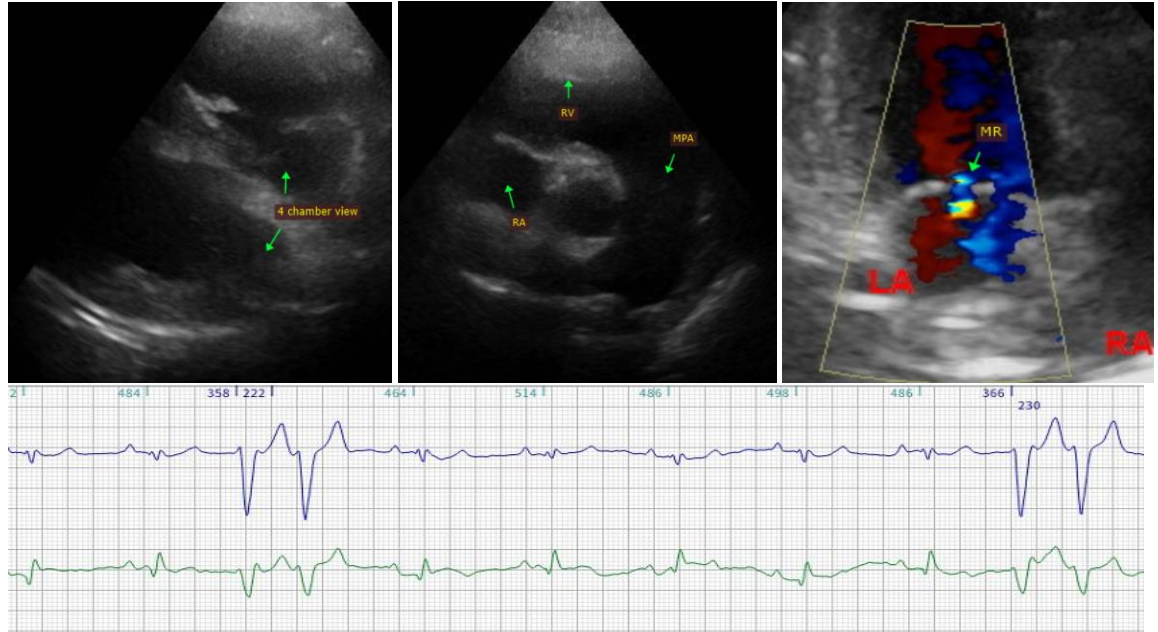
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If Sotalol is elected, a recheck ECG/holter in 1-2 weeks to assess response. A recheck echocardiogram is recommended in 6-12 months to screen for any development of progressive issues.

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.

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