



**PATIENT**

Sloan Zimmerman

**SPECIES**

Canine

**BREED**

Boxer

**SEX**

Male Neutered

**AGE**

9 years

**WEIGHT**

76lbs

**INTERPRETED BY**

Maggie Machen  
 Lamy, DVM, DACVIM  
 (Cardiology)

**IMAGING PERFORMED BY**

Jenna Walsh, CVT

**HOSPITAL NAME**

Sutherland Veterinary  
 Hospital

**REFERRING VET**

Dr. Herrera

**INVOICE**

25646

**DATE**

8/8/22

**PRESENTING CLINICAL SIGNS**

History: Had a few episodes of collapse. No murmur auscultated.  
 -BP: 184/120 MAP 145 168/112 MAP 132 178/104 MAP 121mmHg.

**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 brief single lead ECG is included; 25mm/s, 10mm/mV. The average heart rate is 90bpm (range 60-115bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. No ectopic beats, pauses or dysrhythmias observed.

ECG diagnosis: Normal sinus rhythm with respiratory variation.

**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and doppler imaging is available. Mild mitral valve thickening with no obvious prolapse into the left atrial lumen. Trace mitral regurgitation; normal left atrial dimension. Normal LV diameter with adequate myocardial function. 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 significant right heart disease. The pulmonic is normal in morphology and mobility. The aortic valve is mildly thickened. Mildly elevated LVOT and normal RVOT velocity. No aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No obvious cardiac tumors 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	NM	NA	1.2	1.3	44	80	0.3
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	160	2.2	1.5	34.5	2.7	4.1	2.3
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
<b>BODY WEIGHT DEPENDENT PARAMETERS</b>				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)

Adapted from June Boon, Veterinary Echocardiography, 1998  
 Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435  
 Hansson et al, Vet Rad and Ultrasound 2002  
 Bonagura et al. Echocardiography: principles of interpretation, Vet



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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**

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. A mildly elevated LVOT velocity is noted, which is a benign finding and may lead to a soft basilar murmur depending on HR/hydration status. No additional issues are identified. The ECG is unremarkable with a respiratory sinus arrhythmia.

Syncope episodes may be caused by a variety of underlying conditions in a Boxer. The first important delineation is cardiogenic syncope versus seizure, with the hallmark of syncope being of short duration and normal mentation immediately prior to and following the episode. Possible causes for cardiogenic syncope include vaso-vagal events, brady or tachyarrhythmias, or another underlying disease causing poor cardiac output (like dilated cardiomyopathy). Because it can be difficult to differentiate between syncope and seizures, the episodes may also be due to underlying neurologic causes.

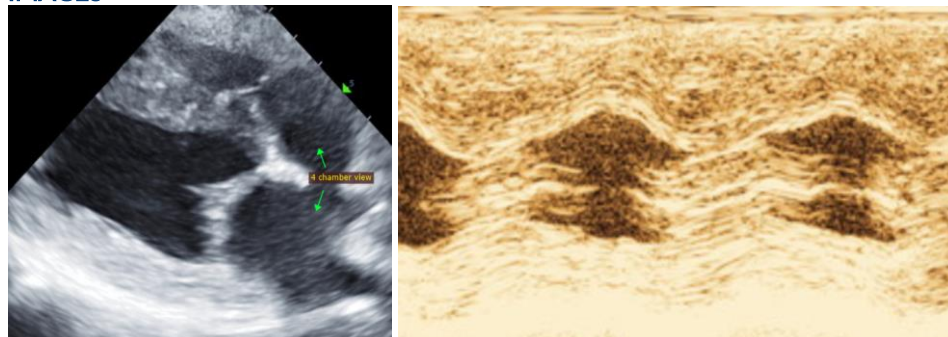
Today we were able to rule out several potential causes for the episodes. The echocardiogram ruled out significant structural problems with the heart and along with a normal activity level and physical examination, underlying structural disease is very unlikely. Additionally, no obvious cardiac neoplasia or effusions were seen in this study. Despite a normal structure and function however, occasional bouts of increased or decreased heart rate are possible and may cause a syncope episode (ECG not performed, nor heart rate provided). ARVC or Boxer Cardiomyopathy has both a structural and a purely arrhythmic form. Given the high predisposition for arrhythmias/ARVC in this breed (although typical age of onset is 6-8yo). Even with a normal baseline ECG, a holter monitor is highly recommended to evaluate the heart rate and rhythm throughout the day and during normal daily routine (and particularly during an episode). VT is a life-threatening rhythm in dogs, and further evaluation should be done as quickly as possible.

No obvious cardiac medications are indicated. Monitor at home for any further episodes, cough/labored breathing and/or exercise intolerance.

Pending ECG/Holter results further diagnostics or therapy may be indicated.

Recheck echocardiogram is recommended in 1 year to screen for any progressive changes.

**IMAGES**





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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. 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**  
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