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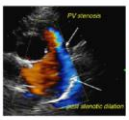
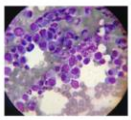
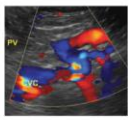
SVS IMAGING

SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

PATIENT

Sadie Bauer

SPECIES

Canine

BREED

Labrador Retriever

SEX

Female

AGE

10 years

WEIGHT

70lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Landry

INVOICE

25070

DATE

6/29/22

PRESENTING CLINICAL SIGNS

History: History of seizures. Recent seizure activity presented different than before. Presented today with noticeable arrhythmia. She is having high anxiety and is on trazodone.
-Abnormal PE/Chem/CBC/UA Results: BW shows she is anemic.

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 180bpm 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. Isolated VPCs throughout; singles only, monomorphic. No obvious atrial premature beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus tachycardia with frequent isolated VPCs.

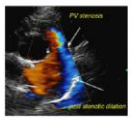
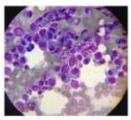
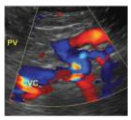
ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. No left ventricular dilation with moderate systolic dysfunction. Normal LV wall thickness and mildly increased sphericity. Moderate left atrial enlargement. The mitral valve appears mildly thickened with no obvious prolapse into the left atrial lumen. Mild to moderate eccentric mitral regurgitation. Decreased velocity. The tricuspid valve appears thickened with moderate to severe TR. Velocity consistent with early pulmonary hypertension. Moderate right atrial and ventricular dilation. The aortic and pulmonic valves appear normal in morphology and mobility. Normal LVOT/RVOT velocity. 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	4.5	3.0	NM	1.8	20	36	1.0
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	1.6	1.0	31.8	3.9	4.1	3.3
*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)
				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)
				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)

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 Clin North Am 15:1177, 1995

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately, this patient has changes most consistent with occult Dilated Cardiomyopathy (DCM). There is a decline in systolic function, accompanied by LA dilation. What is unusual is the LV is not particularly dilated and it is difficult to know how much the arrythmia is impacting this appearance. Of additional concern, the right heart is more significantly affected than the left with moderate to severe TR. A primary congenital valvular issue is possible given the breed; however, an RV cardiomyopathy is also possible. Regardless, the LA and RA are both moderately increased in dimension, indicating the risk for progression is high. In the future the risk will persist for development of congestive heart failure, malignant arrhythmias (AF, VT), collapse and/or sudden death.

Systolic failure can be primary in nature (DCM) or secondary to taurine deficiency, certain drugs such as Doxorubicin, myocarditis, hypothyroidism, tachycardia-induced cardiomyopathy, or infiltrative disease such as lymphoma. In a senior large breed dog, primary disease is certainly possible. That being said, consider testing for primary causes that may be treatable such as a full thyroid panel. A cTnI level can be submitted to further investigate possible infiltrative/inflammatory damage (myocarditis; not suspected). Finally, a taurine level may be helpful (to screen for concurrent malabsorption issue). Regardless of result, I would institute a taurine supplement to cover all bases. A thorough diet history is recommended, assessing for grain free, boutique brands and/or exotic ingredient options with a diet change if indicated. Regardless of cause, prognosis is guarded long term with risk for complications going forward.

Recommend Pimobendan in this case based upon these findings. Close monitoring and medication will help give the best prognosis possible, which remains guarded long-term. In the absence of clinical signs, no additional medications are clearly indicated at this time.

The ECG does confirm the arrhythmia is due to single ventricular premature contractions (VPCs). 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. Monitoring for progression is advised, assessing for acute lethargy or collapse.

VPCs are a very non-specific finding and this dog with structural disease this may be related. They can be primary in origin such as ARVC, be secondary to significant cardiac disease, or be extra-cardiac in origin, i.e., due to pain, stress, inflammation, cancer, GI disease, DIC/sepsis, etc. In this dog with structural disease, these may certainly be related; however exacerbating issues should be considered. An abdominal ultrasound to monitor for any underlying abnormalities, in addition to full lab work, tick titers, cardiac troponin level, etc. can be considered. Unfortunately, there is always an elevated risk for collapse and sudden death in any arrhythmic patient, and even on medications this risk unfortunately still persists.

Based strictly on the amount of arrhythmia present, low markers of malignancy (such as polyporphism), and a lack of confirmed clinical signs at home, it is difficult to know if anti-arrhythmic therapy is warranted. The patient has a history of seizures that have changed in appearance, which may certainly reflect arrhythmogenic syncope. This is difficult to prove with only single beats seen; however, if suspicion is high, I would consider use of Sotalol at this time. If there is any question, consider a holter monitor as the next step. Discussion with the owner is advised.

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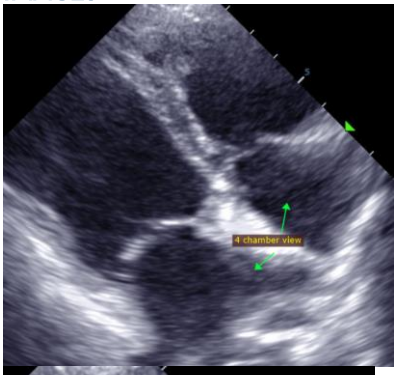
Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes in the future. Monitoring of sleeping breathing rates at home is recommended to screen for progression in the future. Mild activity restriction is advised. Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.

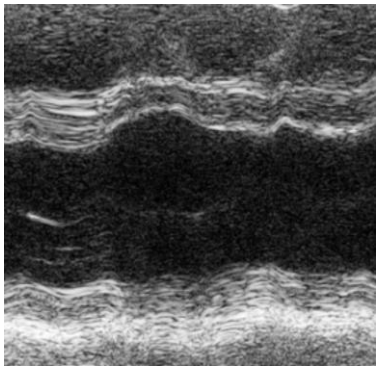
PLAN

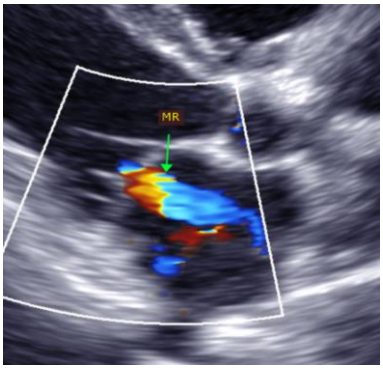
Institute Pimobendan 0.25-0.3mg/kg PO q12h. A screening BP is recommended with institution of an ACEI (0.5mg/kg PO q12) if persistently >150mmHg. Institute taurine supplement 1000mg PO q12h. Consider thyroid panel, cTnI, taurine level as discussed. If suspicion for arrhythmogenic syncope is high, institute Sotalol 1-2mg/kg PO q12h with a recheck ECG in 1-2 weeks. A holter monitor is recommended if there is any question on this diagnosis.

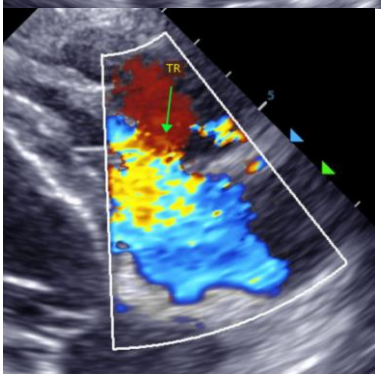
A recheck echocardiogram is recommended in 6 months to assess for progression, sooner if clinical signs arise.

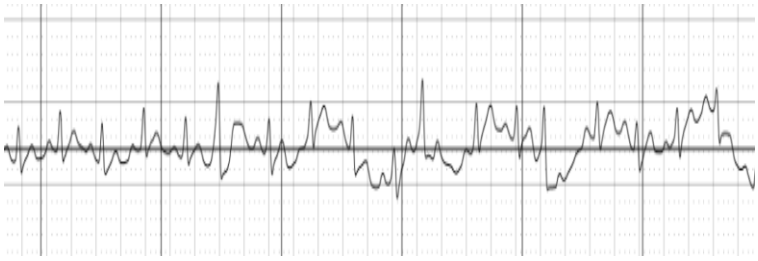
IMAGES











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. 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