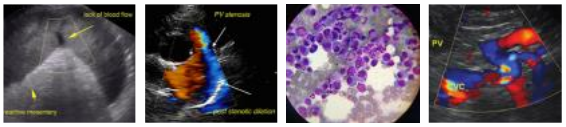
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com



ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Whiskey Warden

SPECIES
Canine

BREED
St Bernard

SEX
Male Intact

AGE
11 years

WEIGHT
173lbs

INTERPRETED BY
Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
Ark Animal Hospital

REFERRING VET
Dr. Jackson

INVOICE
23448

DATE
4/5/22

PRESENTING CLINICAL SIGNS

History: Presenting for increased breathing rate and effort. Seen 1 month ago was normal.
-ECG at that time (Idexx report available): NSR.

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; 50mm/s, 20mm/mV. The average heart rate is 220bpm with an irregularly irregular rhythm. No identifiable P waves consistent with atrial fibrillation.
ECG diagnosis: Rapid atrial fibrillation.

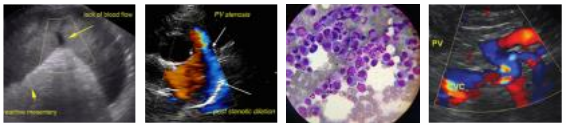
ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Moderate left ventricular dilation with decreased systolic function. Decreased LV wall thickness and increased sphericity. Moderate to severe left atrial enlargement. The mitral valve appears mildly thickened with no obvious prolapse into the left atrial lumen. Moderate central mitral regurgitation. Normal MR velocity. The tricuspid valve appears mildly thickened. Mild right atrial and ventricular dilation. Mild tricuspid regurgitation, velocity consistent with early pulmonary hypertension. The aortic valve is normal in morphology and mobility. Trace aortic and pulmonic insufficiency. Normal pulmonic valve. Decreased LVOT and RVOT velocities. No pericardial or pleural effusion noted. Ascites noted on sub-costal views. 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	5.1	3.0	1.4	1.9	11	20	0.62
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	240	2.5	0.7	78.5	5.3	5.4	4.8
*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)
				10	1.50 (3.8)	3.27 (3.5)	2.06 (3.1)
Adapted from June Boon, Veterinary Echocardiography, 1998				15	1.83 (2.0)	3.71 (2.4)	2.43 (2.1)
Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435				20	2.02 (1.9)	4.14 (2.2)	2.80 (2.0)
Hansson et al, Vet Rad and Ultrasound 2002				25	2.18 (2.4)	4.48 (2.9)	3.10 (2.5)
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995				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)

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



ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Whiskey Warden

SPECIES
Canine

BREED
St Bernard

SEX
Male Intact

AGE
11 years

WEIGHT
173lbs

INTERPRETED BY
Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
Ark Animal Hospital

REFERRING VET
Dr. Jackson

INVOICE
23448

DATE
4/5/22

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Unfortunately, this patient has significant cardiomyopathy and systolic dysfunction. This is causing dilation and overload of all 4 chambers resulting in insufficiency of the mitral and tricuspid valves. There is severe LA and LV dilation indicating high risk for complication going forward. Early pulmonary hypertension is noted, which is likely due to active congestion. No additional issues are identified.

Systolic failure can be primary in nature (DCM) or secondary to taurine deficiency, myocarditis, tachycardia-induced cardiomyopathy, or infiltrative disease such as lymphoma. In a senior large breed dog, primary disease is certainly a possibility; however, consider testing for primary causes that may be treatable. A thyroid and taurine level can be submitted to further investigate infiltrative/inflammatory contribution (myocarditis). Additionally, a taurine level may be helpful (screen for malabsorption issue) with avoidance of grain free, exotic ingredient or boutique brand options going forward.

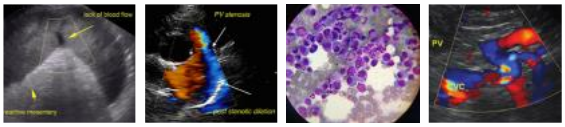
Regardless of cause, prognosis is guarded to poor at this stage in the disease process, with an average survival time of <6 months. Patient will always be at risk for recurrent CHF, development of malignant arrhythmias and/or sudden death in the future. The only treatable cause of systolic failure is taurine deficiency, which is uncommon on commercially formulated dog foods (albeit renewed with the recent correlation to grain free diets). If a taurine level is declined, it is also reasonable to simply supplement with taurine on the off chance of a malabsorption issue.

As a complicating factor, the patient has also developed rapid atrial fibrillation (AF) secondary to atrial dilation. This was not noted on the exam previously and is likely the cause of acute worsening signs. Ideally a 6-lead tracing would be performed to confirm the diagnosis; however, suspicion is high. Development of the arrhythmia puts the patient at high risk for acute decompensation and development of right-sided congestion (ascites in this case). AF is characterized by disorganized contractions of the atria leading to an irregular heart rhythm. The irregular heart rhythm rarely causes clinical signs in dogs. However, atrial fibrillation also usually causes an increase in the heart rate, and this can lead to clinical signs and CHF as we see in this patient. Once a patient is in AF, this will likely never convert back to sinus rhythm, however they typically do well with simply rate control. The structural disease and development of AF requires lifelong diuretics (due to high risk for decompensation) and management of the structural disease in addition to the arrhythmia as below. Close monitoring going forward is advised.

Monitoring of sleeping respiratory rates will be paramount to screen for recurrent congestive heart failure at home in the future. Cough suppression to improve QOL can also be considered once diuretics are on board for any residual mechanical cough in the face of normal sleeping respiratory rates.

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 to CHF. Omega fatty acid supplementation (1000mg once to twice daily) and mild salt restriction may be of some long-term benefit.

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



ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Whiskey Warden

SPECIES
Canine

BREED
St Bernard

SEX
Male Intact

AGE
11 years

WEIGHT
173lbs

INTERPRETED BY
Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
Ark Animal Hospital

REFERRING VET
Dr. Jackson

INVOICE
23448

DATE
4/5/22

PLAN:

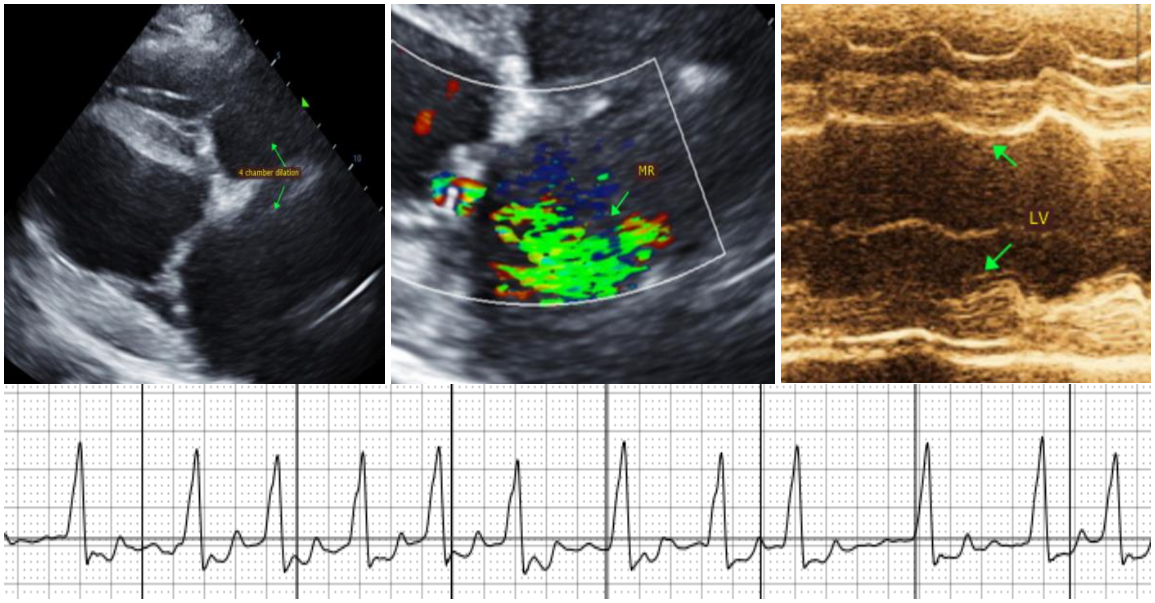
If the patient appears unstable, recommend offer referral for 24-hour monitoring/supportive care and IV rate control/diuretics. Recommend the following oral medications: Pimobendan 0.3mg/kg PO q12h, Lasix 1-2mg/kg PO q12h; Spironolactone 1-2mg/kg PO q12h; Diltiazem 1-2mg/kg PO q8h. Institute taurine supplement 1000-2000mg PO q12h. Consider diet history, taurine level, cTnI, etc. as discussed.

Recheck BP, heart rate/ECG and renal values in 5-7 days. If BP >130mmHg and patient is feeling well, institute Benazepril at that time (0.5mg/kg PO q12h). Target HR is 140-160bpm in hospital/stressed. Up-titrate diltiazem to effect. If difficult to control, can also consider digoxin (0.005mg/kg PO q12h with close monitoring of blood dig levels) due to synergistic effect with diltiazem.

Monitor renal values/BP/HR every 3-4 months lifelong.

A recheck echocardiogram is recommended in 4-6 months to screen for progression.

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