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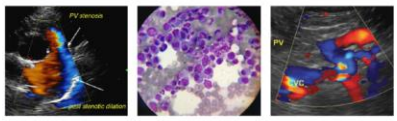

SonoPath
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PATIENT

Aurora Border Tails Rescue

SPECIES

Canine

BREED

Mastiff Mix

SEX

Female Intact

AGE

~10 years

WEIGHT

94lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Presier

INVOICE

25209

DATE

7/7/22

PRESENTING CLINICAL SIGNS

History: History is limited. Current problem list includes diabetes, kidney failure and ascites.

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

Significant cardiomegaly with 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 160bpm (range 115-188bpm). No identifiable P waves with an irregularly irregular rhythm most consistent with atrial fibrillation.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. Severe mitral regurgitation. Marked left atrial dilation. Decreased MR velocity. Mild LV dilation with mildly depressed myocardial function. The tricuspid valve appears mildly thickened with moderate TR. Velocity consistent with mild pulmonary hypertension. Moderate right atrial and ventricular dilation. No obvious RVH. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No obvious aortic or pulmonic insufficiency. Small volume pericardial effusion noted. No pleural effusion. No obvious cardiac masses.

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	5.4	3.1	2.8	2.8	27	50	2.0
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	120	1.3	0.8	42.6	6.4	6.3	4.7
*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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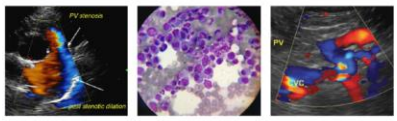

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Chronic degenerative valve disease causing severe mitral and moderate tricuspid regurgitation. The degree of disease is significant with severe LA dilation. Additionally, severe disease has progressed to 4 chamber dilation and consequently atrial fibrillation (AF) and congestive heart failure. Ascites and pericardial effusion are noted which is likely reflective of right-sided congestive heart failure and there is risk for left-sided failure as well. Mild pulmonary hypertension is noted, which is likely secondary to active congestion. Mild LV dysfunction is not surprising, given the breed and arrhythmia. No additional structural issues are identified.

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, leading to CHF. Development of AF and CHF requires lifelong diuretics and management of the structural disease in addition to the arrhythmia.

What is unusual in this case is the heart rate is highly variable with periods as low as 100bpm. Because of this, it would be surprising if the AF alone is what led to bicativary effusion, unless the patient was previously tachycardic. Based upon what is seen here, it is difficult to know if rate control is indicated. The finding of concurrent body cavity effusions, increases suspicion that periods of tachycardia are truly present, not captured here. **The ideal option in this case would be hospitalization for overnight ECG monitoring at an ER or Multi-Specialty Center.** If this is declined, consider treatment for CHF as below with close follow up of the arrythmia, ideally through a holter monitor. If not further evaluated, this patient certainly has risk for acute collapse or sudden death going forward.

Unfortunately, dogs with CHF and AF are at high risk for complications such as recurrent congestive heart failure, malignant arrhythmias, left atrial tear and sudden death. Medications and close monitoring will help give the best prognosis possible, however the average survival time with this condition is <6 months. **This does not take into account concurrent renal failure, which certainly may limit treatment options. In a rescue situation, euthanasia may be a reasonable option, particularly if quality of life is suffering.**

Goals of therapy include correcting water retention, improving myocardial contractility, afterload reduction, and heart rate control if deemed necessary by further evaluation. Full cardiac support is recommended as below.

Monitor at home for cough, lethargy, inappetance, collapse/fainting episodes or increase in respiratory rate or effort. Monitoring of sleeping breathing rates is recommended to screen for recurrent CHF at home. Moderate activity restriction is advised. Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.

PLAN

Highly recommend referral for overnight ECG monitoring. If unable or declined, oral medications are recommended as follows: Institute Spironolactone 1-2mg/kg PO q12 hours. Administer Lasix 1-2mg/kg PO q8h for 3-5 days, if doing well at that time decrease to q12h going forward. Administer Pimobendan 0.3mg/kg PO q12 hours. If referral is declined, a recheck ECG is recommended in 5-7 days, sooner if any decline in the interim. If the heart rate remains variable, a holter monitor is strongly recommended. A renal panel is recommended at this visit as well. If quality of life suffers, renal panel should be considered.

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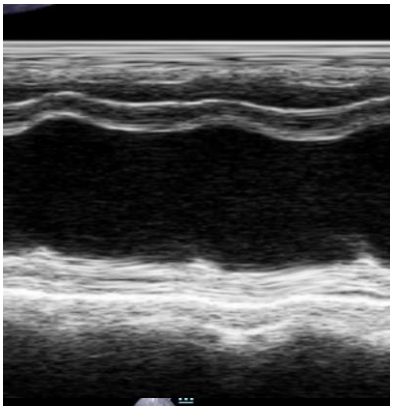
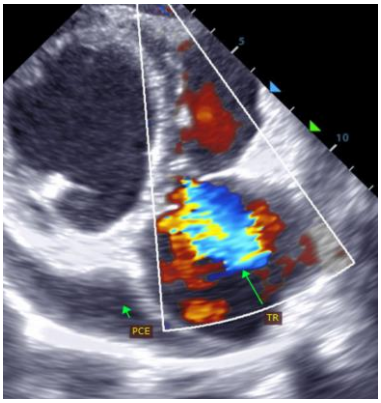
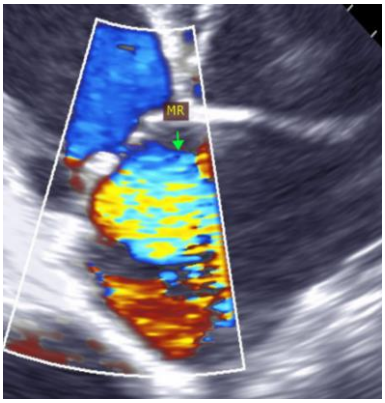
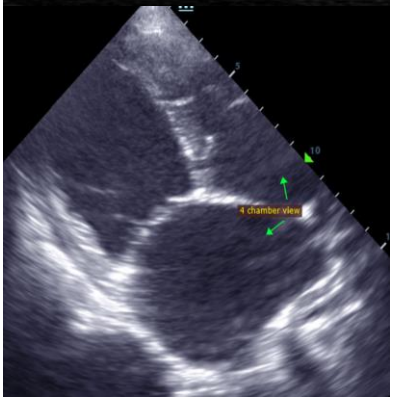
Monitor renal values and BP every 3-4 months lifelong. Do not use an ACE-I given concurrent renal disease.

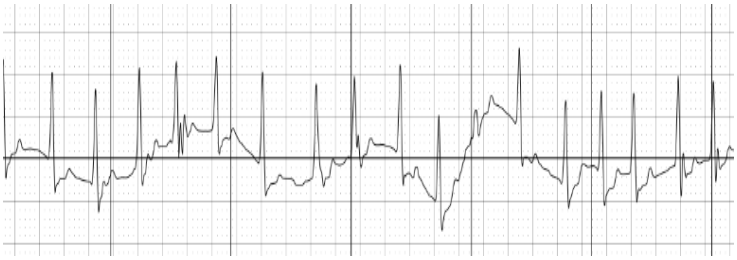
A recheck echocardiogram is recommended in 6 months to screen for progression.

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. 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