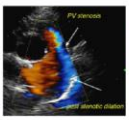
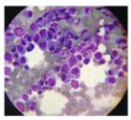
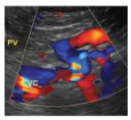
IMAGING PERFORMED BY
svsmobileimaging.com 309 - 737 - 3070

SVS IMAGING

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

PATIENT

Ginger Serafin

SPECIES

Canine

BREED

Mix

SEX

Female Spayed

AGE

11.8 years

WEIGHT

62.6lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Karrels

INVOICE

26740

DATE

10/5/22

PRESENTING CLINICAL SIGNS

History: Presented for seizure-like episodes. Severe tachycardia and arrhythmia. Potential heart murmur noted on exam. VHS 11.5-12. Lungs sound clear. On gabapentin and carprofen

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

A single lateral film is included. Mild right-sided cardiomegaly. 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 single lead ECG is available; 25mm/s, 10mm/mV. The average heart rate is 190bpm (range 150-200bpm). No identifiable P waves with an irregularly irregular rhythm most consistent with atrial fibrillation.

ECHOCARDIOGRAM FINDINGS

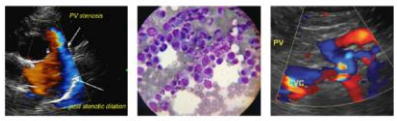
2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve leaflets with no obvious prolapse into the left atrial lumen. No mitral regurgitation with normal left atrial dimension. Normal LV diameter with adequate myocardial function. The tricuspid valve appears mildly thickened with moderate tricuspid regurgitation. Velocity consistent with severe pulmonary hypertension. Mild to moderate right atrial enlargement; severe right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. Systolic flattening of the IVS consistent with pressure overload. The pulmonic and aortic valves are normal in morphology and mobility. Mild MPA and branch dilation. No obvious pulmonic or aortic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion noted. No cardiac tumors observed.

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	NA	5.4	1.3	1.3	57	94	0.5
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	180	1.0	0.99	28.4	2.6		
*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 *Note: All measurements based upon multi-modal images and methods. An average value is reported.*				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)
				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

IMAGING PERFORMED BY
svsmobileimaging.com 309 - 737 - 3070



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

PATIENT

Ginger Serafin

SPECIES

Canine

BREED

Mix

SEX

Female Spayed

AGE

11.8 years

WEIGHT

62.6lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Karrels

INVOICE

26740

DATE

10/5/22

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The primary abnormality identified is severe pulmonary hypertension (PAH), as evidenced by an elevated TR velocity and significant right heart compensatory changes. The estimated systolic pulmonary arterial pressure is >100mmHg, with normal being <25mmHg. The degree of hypertrophy and dilation of the right ventricle and MPA is indicative of right-heart pressure overload. The left heart is normal, without significant pathology.

The underlying genesis of PAH is poorly understood in cases other than heartworm infestation, though it occurs with increased frequency in a variety of forms of chronic lung disease and in patients with idiopathic pulmonary fibrosis. Without a specific breed or chronic case history, cause remains open. Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to severe PAH. It is important to note that PAH is not the cause of a cough in these cases, rather it develops secondary to a chronic cough/labored breathing. Patients with this degree of PAH can develop right-sided congestive heart failure (ascites), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given reported syncope, medical management with Pimobendan and Sildenafil is certainly indicated as below. As mentioned previously, adequate cough control is also key to managing these cases if present currently or in the future.

As a complicating factor the ECG does confirm an arrythmia with atrial fibrillation (AF) suspected. A six-lead tracing would be necessary to definitively diagnosis the rhythm; however, suspicion is high.

AF is characterized by disorganized contractions of the atria leading to an irregular heart rhythm. The irregular heart rhythm itself 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. The development of atrial fibrillation typically occurs with severe atrial enlargement and is quite unusual to see with this particular type of disease. Additionally, the onset of atrial fibrillation (AF) is typically accompanied by average heart rates >200bpm and leads to decompensation and right-sided CHF (tachycardia-induced cardiomyopathy) neither of which are appreciated. It is unusual in this case that the AF rate is only mildly elevated (170-190bpm on exam) and typically the target of rate control is 140-160bpm. Regardless, low dose Diltiazem is recommended with a goal of blocking periods of elevated heart rates. Pulmonary hypertension is considered to be the more likely cause of syncope; however, the arrhythmia may certainly be contributing.

Given the unusual nature of this case, highly recommend referral to a local Cardiologist for advanced evaluation and management as the gold standard.

Unfortunately, there will always be risk for concurrent congestive heart failure, malignant arrhythmias and sudden death. Medications and close monitoring will help give the best prognosis possible, however the average survival time with this condition is <1 year.

Once stable, use of theophylline and/or taper course of anti-inflammatory steroids can also be beneficial in these cases, to treat exertional dyspnea or acute flare ups and decrease the inflammatory component as much as possible. PRN use of cough suppressants may also be beneficial. Unfortunately, the prognosis overall is poor, however I am hopeful we can provide some improved medical relief going forward.

PATIENT

Ginger Serafin

SPECIES

Canine

BREED

Mix

SEX

Female Spayed

AGE

11.8 years

WEIGHT

62.6lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Karrels

INVOICE

26740

DATE

10/5/22

Omega fatty acid supplementation (anti-inflammatory) may be of some long-term benefit. Monitor for worsening of labored breathing, exercise intolerance or collapse episodes.

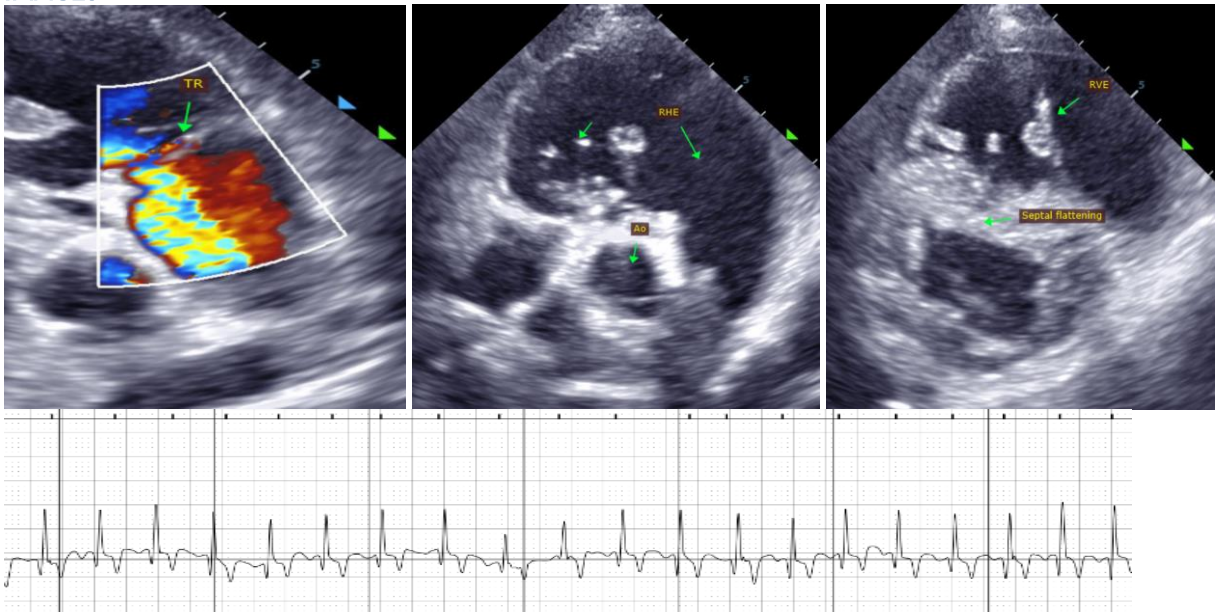
PLAN:

Recommend referral as discussed. A 6 lead ECG is recommended if possible. If declined, institute sildenafil 1-2mg/kg PO q8h. Institute Pimobendan at 0.3mg/kg PO q12h. Institute Diltiazem 30mg PO q8h. Consider hydrocodone as needed up to every 4-6hours PRN for cough if indicated.

Recheck ECG in 1-2 weeks, sooner if any decline in the interim. Target heart rate is 140-160bpm.

Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any development of clinical signs.

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