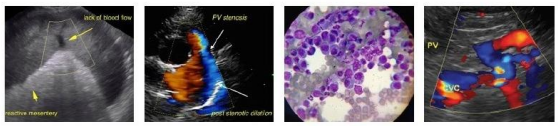
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com



Portable Animal Western Sonography, Inc.
IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

PATIENT
Ivy Edwards

SPECIES
Canine

BREED
Maltese Mix

SEX
Female Spayed

AGE
9 years

WEIGHT
9lbs

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

IMAGING PERFORMED BY
Loetitia St-Jacques, LVT/RVT

HOSPITAL NAME
VCA Baring Blvd Vet

REFERRING VET
Dr. Parke

INVOICE
30615

DATE
5/4/23

PRESENTING CLINICAL SIGNS

History: Grade 4/6 heart murmur. Recent cough with syncope. BP: 160; started Telmisartan, follow up BP: 142mmHg. Sedated with Butorphanol IV.
-ECG results (5/2/23): Sinus arrhythmia with increased R waves.
-Radiographs (5/2/23): Thorax NSF. Repeat CXR (5/4/2023): Reportedly concerning for CHF.
-Current medications: Pimobendan 0.625mg PO BID, Started furosemide 5/4/2023 4mg/kg dose IM to start, will follow up this evening with 12.5mg PO BID. Due to anorexia, will temporality stop telmisartan unless needed for further management of heart disease. Tachypnea has improved with furosemide therapy today.

ECHOCARDIOGRAM FINDINGS

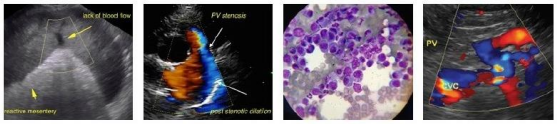
2D, m-mode, color flow and doppler imaging is available. Mild thickening of mitral valve leaflets with mild prolapse into the left atrial lumen. No mitral regurgitation with a normal left atrial dimension. Small LV diameter with adequate myocardial function. Subtle septal flattening. The tricuspid valve appears mildly thickened with mild tricuspid regurgitation. Moderate right atrial enlargement; moderate right ventricular dilation and hypertrophy consistent with pulmonary arterial hypertension. TR velocity consistent with moderate to severe PAH. The pulmonic and aortic valves are normal in morphology and mobility. Moderate main PA and branch dilation. Trace pulmonic and aortic insufficiency. Normal pulmonic and aortic outflow velocities. No pericardial or pleural effusion. 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	4.6	NM	1.1	39	73	NM
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	113	1.3	0.8	4.1	1.4	1.6	1.0
*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

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



IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

PATIENT
Ivy Edwards

SPECIES
Canine

BREED
Maltese Mix

SEX
Female Spayed

AGE
9 years

WEIGHT
9lbs

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

IMAGING PERFORMED BY
Loetitia St-Jacques, LVT/RVT

HOSPITAL NAME
VCA Baring Blvd Vet

REFERRING VET
Dr. Parke

INVOICE
30615

DATE
5/4/23

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Severe pulmonary hypertension (PAH) is present, as evidenced by an elevated TR velocity and right heart/MPA enlargement. The estimated systolic pulmonary arterial pressure is >80mmHg, with normal being <25mmHg. This is causing hypertrophy and dilation of the right heart and MPA (indicating right-heart pressure overload). The left heart dimensions are normal without significant pathology. No tumors or effusions are appreciated. A small aortic insufficiency is noted, and lifelong blood pressure monitoring is recommended.

Clinical signs of weakness, heavy breathing, cyanosis, and syncope are attributed to PAH. 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. If not performed, a heartworm antigen test is recommended. Given the signalment and reported cough, COPD/chronic bronchitis and/or upper airway disease as an underlying cause with an acute secondary exacerbating insult (infectious or inflammatory) is suspected. Patients with this degree of PAH and pulmonary disease can develop right-sided congestive heart failure (ascites/pleural effusion), debilitating cyanosis, labored breathing and exertional syncope if poorly controlled.

Given the recent history of respiratory signs and syncope, the most common cause is an infectious or inflammatory insult causing a decline in already poor oxygenation status. A PTE cannot be ruled out. Coverage with broad spectrum pulmonary antibiotic (fluoroquinolone) is recommended, in addition to aggressive vasodilation using pimobendan and sildenafil. **I would not utilize a diuretic, as decreasing blood volume can further decrease preload and worsen clinical signs.** There may be risk for right-sided CHF in the future; however, no effusions are noted making this unlikely. If the patient experiences any additional respiratory compromise, continued hospitalization for oxygen support and IV antibiotics may be necessary.

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 medical relief going forward.

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

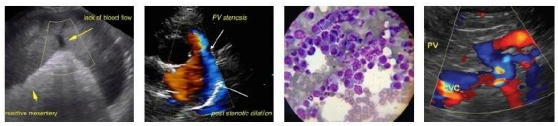
Telmisartan was initiated presumably for systemic hypertension; however, a stressed BP of 160mmHg does not clearly warrant therapy. Recommend reassess once patient is clinically well to determine if therapy is warranted.

PLAN

Discontinue Lasix. Institute Pimobendan 0.3mg/kg PO q12h. Institute sildenafil (Viagra) 1-2mg/kg PO q8h. Consider course of Baytril and oxygen support. Can also use more aggressive hydrocodone and/or theophylline depending on chronic clinical signs of cough/exertional dyspnea.

Reassess breathing status, CXR and BP in 1-2 weeks.

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



Portable Animal Western Sonography, Inc.
IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

PATIENT
Ivy Edwards

SPECIES
Canine

BREED
Maltese Mix

SEX
Female Spayed

AGE
9 years

WEIGHT
9lbs

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

IMAGING PERFORMED BY
Loetitia St-Jacques, LVT/RVT

HOSPITAL NAME
VCA Baring Blvd Vet

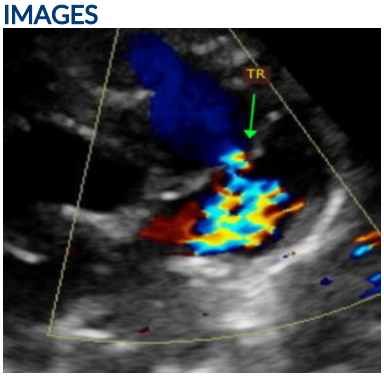
REFERRING VET
Dr. Parke

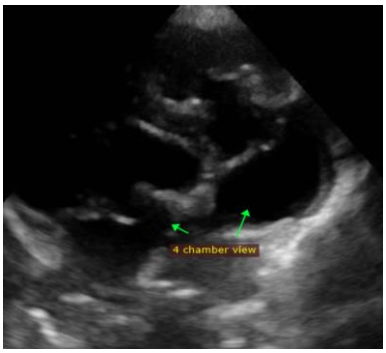
INVOICE
30615

DATE
5/4/23

Recommend recheck echocardiogram in 6 months to reassess pulmonary pressures, sooner if any recurrent clinical signs in the interim.

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