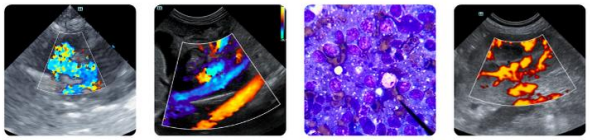



**PATIENT**

Teo Cuestas

**SPECIES**

Canine

**BREED**

Mix

**SEX**

Male Neutered

**AGE**

13 years

**WEIGHT**

33lbs

**INTERPRETED BY**

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

**IMAGING PERFORMED BY**

G. Ferrer, DVM

**HOSPITAL NAME**

Pulse: Pet Ultrasound Services

**REFERRING VET**

Dr. Vega

**INVOICE**

47409

**DATE**

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## PRESENTING CLINICAL SIGNS

History: Presented due to a history of CHF and ascites. Cough with excitement. Grade 4/6 heart murmur ausculted, along with mild ascites. Started Pimobendan 5mg BID, Furosemide 40mg SID and the ascites had minimized. CXR/AUS (2/5/26): mild cardiomegaly (R side), pulmonary vessels on caudal lung field enlarged or distended (R > L), loss of detail in the abdomen due to ascites.

## ECHOCARDIOGRAM FINDINGS

2D-mode, color flow and doppler imaging is available. Mild diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. Trace mitral regurgitation with normal left atrial dimension. Normal LV diameter with adequate myocardial function. Subtle septal flattening. The tricuspid valve appears thickened with moderate tricuspid regurgitation. Velocity is consistent with severe pulmonary hypertension. Severe right atrial and ventricular dilation. The RV is mildly hypertrophied. The MPA and branch dilation. The pulmonic and aortic valves are normal in morphology and mobility. Normal aortic outflow velocities with laminar flow. No obvious aortic and mild pulmonic insufficiency. No pericardial or pleural effusion noted. 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 | NM | 4.5 | NM | 1.2 | 46 | 79 | 0.2 |
| **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 | 115 | 1.0 | 0.9 | 15.0 | 2.0 | 3.0 | 1.7 |
| *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) |
| Adapted from June Boon, Veterinary Echocardiography, 1998 | | | | 25 | 2.18 (2.4) | 4.48 (2.9) | 3.10 (2.5) |
| Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435 | | | | 30 | 2.33 (3.3) | 4.83 (3.9) | 3.39 (3.4) |
| Hansson et al, Vet Rad and Ultrasound 2002 | | | | 35 | 2.48 (4.3) | 5.17 (5.0) | 3.69 (4.5) |
| Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995 | | | | 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) |

## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

There is severe pulmonary hypertension (PAH) present, as evidenced by an elevated TR velocity and severe right heart/MPA compensatory changes (dilation and hypertrophy). The estimated systolic pulmonary arterial pressure is >80mmHg, with normal being <25mmHg. This is causing severe hypertrophy and dilation of the right ventricle (indicating severe right-heart pressure overload). Clinical signs of weakness, heavy breathing, cyanosis, ascites and syncope are

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attributed to severe PAH. Note that coughing is not a sign of PAH; rather PAH develops secondary to a chronic cough rather than being a primary cause. Further evaluation/tx of the cough symptom is recommended through chest radiographs, broad spectrum antibiotics, hydrocodone, etc. The left heart is essentially normal with a small mitral regurgitation.

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 highly recommended.**

Patients with this degree of PAH can develop right-sided congestive heart failure (ascites, pleural effusion) as is seen in this case, debilitating cyanosis/labored breathing and/or exertional syncope if poorly controlled. The prognosis is guarded to poor with an MST of <1 year after the onset of CHF, however a good quality of life is expected once controlled.

Medical management of PAH and CHF is indicated as below and initial therapeutic dosages are indicated. Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.

Monitor for development of a labored breathing, exercise intolerance or collapse episodes.

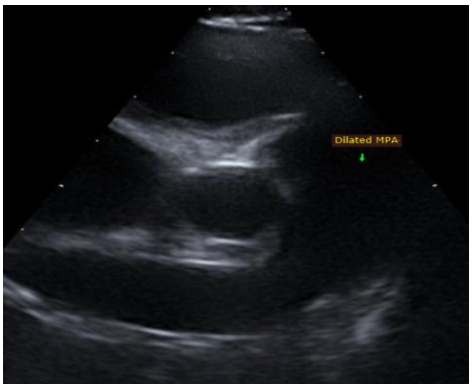
## PLAN

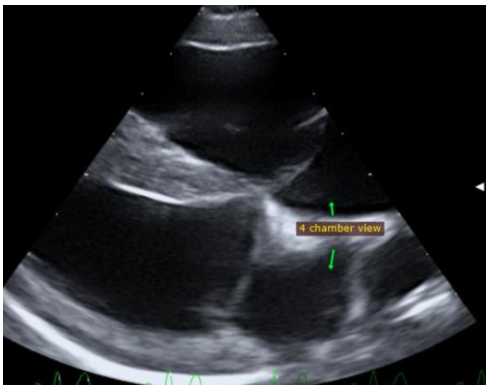
Consider further cough evaluation (CXR, Baytril course, AI prednisone course, hydrocodone, etc.). Continue Lasix at BID dosing; give 1-2mg/kg PO q12h. Institute sildenafil 1-2mg/kg PO q8h. Continue Pimobendan 0.3mg/kg PO q12h. Institute Spironolactone 1-2mg/kg PO q12h. Once eating well at home and clinical signs have resolved, institute ACE-I (benazepril or enalapril) 0.5mg/kg PO q12h. Heartworm antigen test recommended.

Recommend renal panel and BP in 10-14 days, then every 3-4 months lifelong while on diuretics.

Once stabilized, recommend recheck echocardiogram in 6 months to reassess structure and function, sooner if any development of clinical signs.

## IMAGES



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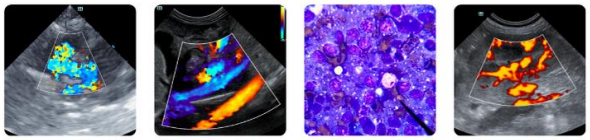

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**The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.**

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