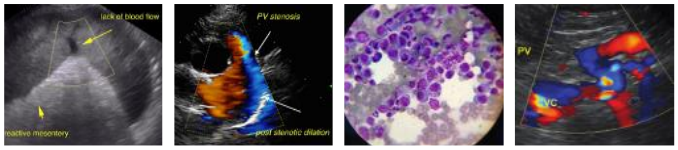
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



SonoPath.com
1-800-838-4268 info@sonopath.com

**PATIENT**
Monty Fruth

**SPECIES**
Canine

**BREED**
Chihuahua Mix

**SEX**
Male Neutered

**AGE**
12 years

**WEIGHT**
4.2kgs

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

**IMAGING PERFORMED BY**
Melissa Weisman, DVM

**HOSPITAL NAME**
Minnesota Veterinary Ultrasound

**REFERRING VET**
Dr. Weisman

**INVOICE**
24162

**DATE**
5/11/22

## PRESENTING CLINICAL SIGNS

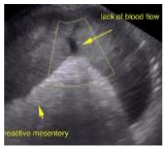
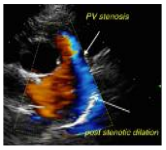
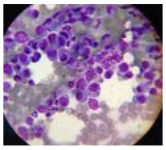
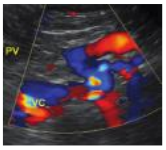
History: Over the prior several months, Monty had reached the point of coughing throughout the day and had become generally lethargic. He had historically been noted to have elevated liver enzymes and a collapsing trachea. On physical exam, Monty had a grade IV/VI L systolic murmur and harsh lung sounds. He had a palpably enlarged liver. Radiographs confirmed cardiomegaly and hepatomegaly, but no evidence for CHF. He was also noted to be hypertensive (158, 138 mmHg mean). Monty was started on pimobendan, enalapril, and hydrocodone, to which he had a very positive response. At this time, Monty is coughing minimally, his blood pressure has normalized, and he seems to be in good spirits overall.
Abnormal PE/Chem/CBC/UA Results: BP 4/12: 138/112 (124) 90/62 (73) 196/169 (179) 200/153 (178) BP 3/22: 152, 138 mean Three view chest radiographs: Moderate to severe cardiomegaly with significant dorsal deviation of trachea and mainstem bronchi collapse; moderate tracheal collapse noted; prominent pulmonary vasculature; no evidence of pulmonary edema at this time. Included portion of abdomen confirmed very enlarged liver, dorsal deviation of stomach. Current meds include: Enalapril- 2.5mg SID, Pimobendan- 1.25mg BID, Hydrocodone- 1.25mg BID

## ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets (anterior>>posterior) with mild prolapse into the left atrial lumen. Moderate eccentric mitral regurgitation with moderate left atrial dilation. Normal MR velocity. Borderline LV with adequate myocardial function. The tricuspid valve appears mildly thickened with moderate tricuspid regurgitation. Velocity consistent with mild pulmonary hypertension (PG: 40mmHg); thought to be a mild under-estimation Mild right atrial enlargement. Mild right ventricular prominence. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic outflow velocities. Normal aortic outflow velocities. No pulmonic or aortic insufficiency. The MPA is not dilated. 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 | 5.6 | 3.3 | NM | 1.7 | 37 | 69 | 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 | 147 | 0.9 | 0.9 | 4 | 1.81 | 2.7 | 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** **Note: All measurements based upon multi-modal images and methods. An average value is reported.* 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 | | | | 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) |

SonoPath.com
1-800-838-4268 info@sonopath.com

**PATIENT**
Monty Fruth

**SPECIES**
Canine

**BREED**
Chihuahua Mix

**SEX**
Male Neutered

**AGE**
12 years

**WEIGHT**
4.2kgs

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

**IMAGING PERFORMED BY**
Melissa Weisman, DVM

**HOSPITAL NAME**
Minnesota Veterinary Ultrasound

**REFERRING VET**
Dr. Weisman

**INVOICE**
24162

**DATE**
5/11/22

| | | | | |
|---|---|---|---|---|
| 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

Chronic degenerative valve disease causing moderate mitral and moderate tricuspid regurgitation. Moderate left and mild right atrial enlargement indicates there is risk for progression to congestive heart failure in the future. Significant TR and moderate PAH are also identified, likely due to respiratory disease in this signalment. Given the combination of MV disease and moderate pulmonary arterial hypertension I would institute Pimobendan at this time in this patient as below. No obvious indication for Sildenafil at this time; however, highly recommend aggressively addressing the cough. If any syncope or exertional dyspnea are noted, institute Sildenafil at that time. Prognosis is guarded at this stage (B2).

Given these findings, the cough is likely multi-factorial in origin. The left atrial enlargement may partially be causing mainstem bronchi compression; however, this breed is highly predisposed to both upper and lower airway disease as well and primary respiratory causes for coughing should also be considered. The AUS results show hepatic congestion, which is surprising with this degree of disease. That being said, if the patient develops any ascites in the future reassessing pulmonary pressures and use of Lasix/spiro are recommended. Pulmonary antibiotics, hydrocodone, etc. may also be useful for a chronic cough. It is important to note that PAH is not the cause of a cough; rather it develops secondary to the chronic cough. Adequate cough control is the most important tool in preventing or slowing it's progression.

The blood pressure is too variable to interpret. Reassess in a quiet setting until the values plateau within 5mmHg.

Once on the medication for 3-5 days, anesthetic risk is considered moderately elevated. Cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction) are recommended. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Judicious IV fluid rates are recommended to avoid fluid overload. Avoid heart rate stimulating drugs such as atropine unless clinically indicated. Pre-oxygenate for 5-10 min prior to intubation and recover in O2 if possible.

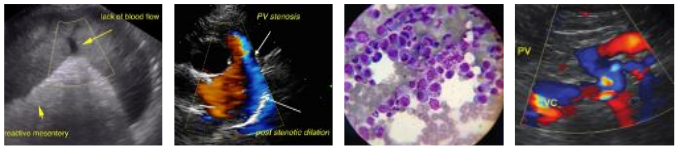
Omega fatty acid supplementation and mild salt restriction may also be of some long-term benefit. Monitor for development of a progressive cough, labored breathing, exercise intolerance or collapse episodes.

## PLAN

Reassess BP as recommended. Administer heart muscle support Pimobendan, 0.25-0.3mg/kg PO BID. Pending BP reassessment, reasonable to continue ACEI 0.5mg/kg PO q12h. Aggressive cough suppression/treatment is recommended as discussed. If exertional dyspnea/collapse is noted and/or patient is refractory to therapy, consider institute Sildenafil 1-2mg/kg PO q8h. If ascites develops, institute Lasix 1-2mg/kg PO q12h and Spironolactone and reassess pulmonary pressures.

Recommend monitor for progression with a recheck echocardiogram in 6 months, sooner if any development of clinical signs.

SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



SonoPath.com
1-800-838-4268 info@sonopath.com

**PATIENT**
Monty Fruth

**SPECIES**
Canine

**BREED**
Chihuahua Mix

**SEX**
Male Neutered

**AGE**
12 years

**WEIGHT**
4.2kgs

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

**IMAGING PERFORMED BY**
Melissa Weisman, DVM

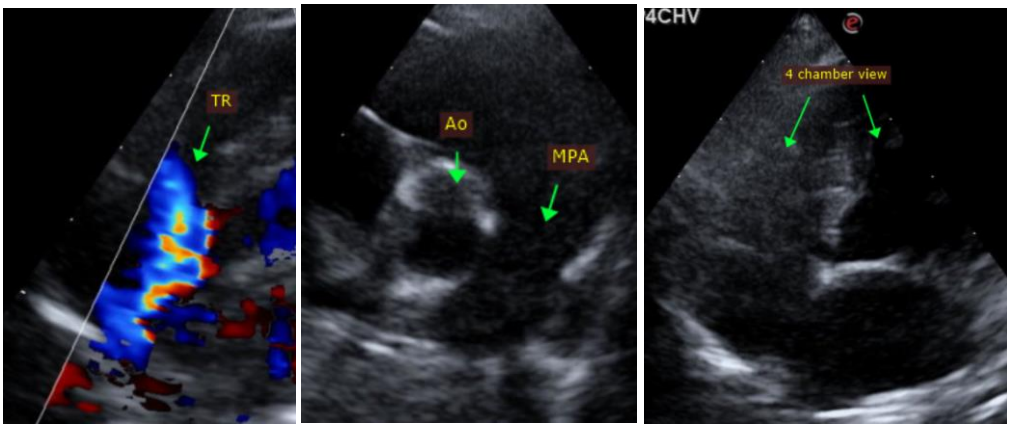
**HOSPITAL NAME**
Minnesota Veterinary Ultrasound

**REFERRING VET**
Dr. Weisman

**INVOICE**
24162

**DATE**
5/11/22

## 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