



**PATIENT**

Buttercup Kittell

**SPECIES**

Canine

**BREED**

Yorkshire Terrier

**SEX**

Female Spayed

**AGE**

13 years

**WEIGHT**

5.81lbs

**INTERPRETED BY**

Maggie Machen Lamy, DVM DACVIM (Cardiology)

**IMAGING PERFORMED BY**

Pamela Harrigan, RDCS

**HOSPITAL NAME**

Mass Veterinary Services

**REFERRING VET**

Dr. Masloski

**INVOICE**

30069

**DATE**

4/5/23

**PRESENTING CLINICAL SIGNS**

History: Buttercup was noted to have a heart murmur in 2020. She was seen for dyspnea in February 2023. An EKG revealed an irregularly, regular rhythm. Chest films (Radiologist report): tracheal collapse, moderate cardiomegaly with right heart enlargement. Enlarged pulmonary arteries. Primary airway disease. Possible CHF, although less likely. An echocardiogram was performed showing moderate to severe pulmonary hypertension with hepatic congestion and CVD B1. Buttercup was started on enalapril, pimobendan, sildenafil and hydrocodone. Her coughing has improved since starting the medications. She now has a resting respiratory rate between 22-25 breaths/minute. Her appetite has decreased a bit, but she continues to eat well. Her activity is normal for her (not too active) with no current collapse episodes noted. On exam: NSR, grade IV/VI murmur with PMI left apical area radiating to right, PSS, lung fields clear, mm pink, moist, CRT<2. BP: 110-120mmHg. Current medications: 1) Pimobendan/vetmedin 1.25mg 1 tab twice a day 2) Enalapril 5mg 1/4 tab twice a day 3) Sildenafil 20mg 1/4 tab twice a day 4) Hydrocodone with homatropine/hycodan 5mg/ml 0.25mls twice a day 5) Lasix/furosemide 12.5mg 1/2 tab every 72hours 6) Entyce prn \*No sedation for study.

**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and Doppler imaging is available.  
**Left ventricle:** The LV diameter is normal with adequate myocardial function. LV wall thicknesses are normal.  
**Left atrium:** The left atrium is normal.  
**Mitral valve:** The mitral valve is mildly diffusely thickened with no prolapse into the left atrial lumen. Mild mitral regurgitation.  
**Aortic valve/aorta:** The aortic valve is normal. Normal aortic outflow velocity; laminar flow. No aortic insufficiency.  
**Right ventricle:** Mild RV hypertrophy and dilation.  
**Right atrium:** Mild RA dilation.  
**Tricuspid valve:** The tricuspid valve appears thickened with mild septal prolapse and mild tricuspid regurgitation; Velocity consistent with moderate pulmonary hypertension.  
**Pulmonic valve/pulmonary artery:** The pulmonic valve is normal in morphology and mobility. No pulmonic insufficiency. MPA and branches are mildly dilated. Normal RVOT velocity; laminar flow.  
**Pericardium/other:** No pericardial or pleural effusion noted. No obvious cardiac masses  
**Heart rhythm:** ECG reveals a sinus rhythm with an average HR of 150 bpm.

**2-Dimensional Measurements**

Ao diam (cm)	1.1
LA diam (cm)	1.4
LA:Ao (Swe)	1.3
IVS thickness (cm)	0.6
LVID diastole (cm)	1.7
PW thickness (cm)	0.6
LVID systole (cm)	0.8
FS (%)	53

**Doppler Measurements**

PV Vmax (m/s)	0.7
AoV Vmax (m/s)	1.2
MR Vmax (m/s)	NM
TR Vmax (m/s)	4.0
TR PG (mmHg)	65



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**INTERPRETATION OF THE FINDINGS**

Chronic degenerative valve disease is identified with mild mitral and tricuspid regurgitation. Lack of significant left atrial enlargement indicates the current risk for complication is low. Moderate pulmonary hypertension is noted, which has likely developed secondary to the chronic cough. The right heart is mildly enlarged with evidence of chronic pressure overload. No concurrent issues such as systolic dysfunction are noted in this study. Assessment of progression in the future will help predict long term prognosis, which is guarded at this stage (B1).

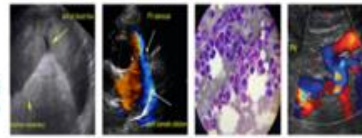
Given these findings, the recent cough/respiratory crisis was **non-cardiogenic in origin**. CHF was ruled out without left heart enlargement and **Lasix should be discontinued**. Respiratory disease is present, and if the cough is poorly controlled/progresses long term, this can certainly lead to worsening of PAH. Clinical signs of significant PAH include exertional dyspnea/collapse. Continued monitoring is advised. Continued cough control is recommended lifelong (hydrocodone, intermittent AI prednisone, fluoroquinolone for acute flare up, etc.). Additionally, Sildenafil and Pimobendan can be continued to help maintain pulmonary pressures. Enalapril should also be discontinued given the patients hypotension and lack of left heart disease.

**RECOMMENDATIONS**

- Continue Sildenafil 1-2mg/kg PO q12h.
- Continue Pimobendan 0.3mg/kg PO q12h.
- Discontinue Lasix and Enalapril as discussed.
- Continue cough treatment as needed.
- Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit.
- Anesthetic risk is considered mild if needed. Cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction, isoflurane gas) are recommended. **Pre-oxygenate for 5-10 minutes prior to induction.** Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Mild IV fluid restriction is recommended to avoid fluid overload. Avoid heart rate stimulating drugs such as atropine unless clinically indicated.
- Monitor for development of a progressive cough, labored breathing, exercise intolerance or collapse episodes.

**PLAN**

- Recommend conservative monitoring with a recheck echocardiogram in 6 months, sooner if any development of clinical signs.



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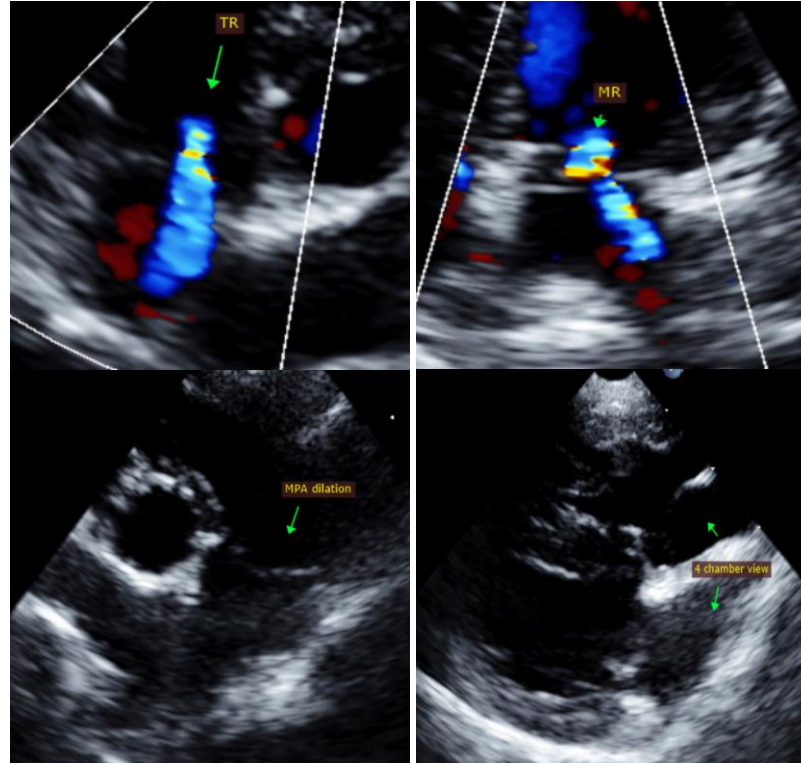
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**IMAGES**



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**  
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**Echocardiogram performed by:** Pamela Harrigan, RDCS  
Pet Animal Ultrasound Service (4paus.com)

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