



**PATIENT**

Chloe Nijens

**SPECIES**

Canine

**BREED**

Maltese

**SEX**

Female Spayed

**AGE**

9 years

**WEIGHT**

8.56lbs

**INTERPRETED BY**

Maggie Machen  
Lamy, DVM  
DACVIM (Cardiology)

**IMAGING  
PERFORMED BY**

Pamela Harrigan,  
RDCS

**HOSPITAL NAME**

Mass Veterinary  
Specialty Services

**REFERRING VET**

Dr. Masloski

**INVOICE**

21278

**DATE**

9/29/21

**PRESENTING CLINICAL SIGNS**

History: Recheck echo. History degenerative valve disease with some elevation of LVOT velocities on January 2017 (2.59 m/s) and possible mild LVH. LA 1.13 cm; LA:Ao 1.2; LV 1.7 cm; RVOT 2.96 m/s, increased, dagger shaped. She was initially placed on atenolol for the outflow tract issue but was weaned off of it. She has not had an echocardiogram repeated since February 2018 (limited study, LVOT 1.85 m/s, RVOT 1.61 m/s) and last full study was 12/27/2017. In August of 2020, she was noted to be coughing - radiographs revealed cardiomegaly. She was started on Enalapril at that time. Two weeks ago, she was seen on an emergent basis for abdominal distension and dyspnea. Started on Pimobendan and Lasix at that time. She has been coughing less since being on the Lasix. Continues to eat well with no current C/S/V/D/PU/PD. Her activity has returned to normal. CV/RESP: NSR, grade IV/VI murmur with PMI left apical area radiating to right, PSS, lung fields harsh on inspiration. BP: 140mmHg x 4.  
-Current medications: 1) Enalapril 2.5mg 1/2 tab daily 2) Pimobendan/vetmedin 1.25mg 1 tab twice a day 3) Lasix/furosemide 12.5mg 1/2 tab twice a day \*No sedation.

**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and Doppler imaging is available.  
**Left ventricle:** The LV is normal in dimension with severely increased wall thicknesses.  
**Left atrium:** The left atrium is moderately dilated.  
**Mitral valve:** The mitral valve is abnormal with a thickened anterior and posterior leaflet. No obvious prolapse seen. Moderate eccentric mitral regurgitation. Elevated velocity. The tip of the anterior leaflet can be seen obstructing flow through the LVOT and systole.  
**Aortic valve/aorta:** The aortic valve is normal in morphology and mobility. Severely elevated aortic outflow velocities. No aortic insufficiency.  
**Right ventricle:** The right ventricular appears mildly hypertrophied. A dynamic RVOTO is suspected on color flow imaging, which appears benign.  
**Right atrium:** Normal RA dimension.  
**Tricuspid valve:** The tricuspid valve is normal with no tricuspid regurgitation.  
**Pulmonic valve/pulmonary artery:** The pulmonic valve is normal in morphology and mobility. No pulmonic insufficiency.  
**Pericardium/other:** No pericardial or pleural effusion noted. No cardiac shunts visualized. No obvious cardiac masses.  
**Heart rhythm:** ECG reveals a sinus rhythm with an average HR of 150bpm.

**2-Dimensional Measurements**

Ao diam (cm)	1.2
LA diam (cm)	2.2
LA:Ao (Swe)	1.8
IVS thickness (cm)	1.0
LVID diastole (cm)	1.8
PW thickness (cm)	1.2
LVID systole (cm)	1.0
FS (%)	44

**Doppler Measurements**

PV Vmax (m/s)	1.8
AoV Vmax (m/s)	5.2
MR Vmax (m/s)	6.5
TR Vmax (m/s)	NA
TR PG (mmHg)	NA



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**INTERPRETATION OF THE FINDINGS**

The academic diagnosis in this case could be argued depending on patient history. If the murmur has been present since birth, this would classify likely mitral valve dysplasia with a significant LVOT obstruction. If the murmur was first noted in 2017, this may reflect some atypical form of valve degeneration versus or in addition to a primary hypertrophic component, such as HOCM (unlikely in a dog). What is unusual is the RV also appears mildly thickened, which is difficult to explain in the absence of a primary myocardial issue. Regardless, the left atrium is mildly dilated indicating there may be risk for progression going forward. The right atrium appears largely normal, making right-sided CHF unlikely to be the cause of previous abdominal distention. No additional issues are identified.

Going forward, more information is required to make the best recommendations. If abdominal distention was confirmed to be ascites which improved with diuretic therapy, it is reasonable to continue Lasix going forward. Aside from this scenario, there is no obvious risk for right-sided congestion and Lasix is likely unnecessary. Reasonable to continue Pimobendan if well tolerated, although with an obstruction this is a controversial medication. Finally, I do recommend Atenolol in this case given the severity of the obstruction and hopes of relieving some of the pressure gradient. Enalapril is only necessary if Lasix is continued going forward.

Patient will always be at risk for progression to CHF, development of malignant arrhythmias and/or sudden death in the future. Lifelong mild activity restriction is advised. Breeding is not advised; however, consider postpone anesthesia until progression is assessed if possible.

**RECOMMENDATIONS**

- Further historical information is necessary to determine if Lasix/ACE-I should be continued as discussed.
- Reasonable to continue Pimobendan as prescribed.
- Institute Atenolol 25mg tablets; Give ¼ tab once daily. Recheck heart rate in 1-2 weeks with target stressed rate of 140-160bpm 12-24 hours post-administration and titrate to effect.
- Close monitoring for development of associated clinical signs, such as a cough, labored breathing, exercise intolerance or collapse episodes.
- 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.

**PLAN**

- A recheck echocardiogram is recommended in 6 months to screen for progression, sooner if clinical signs arise



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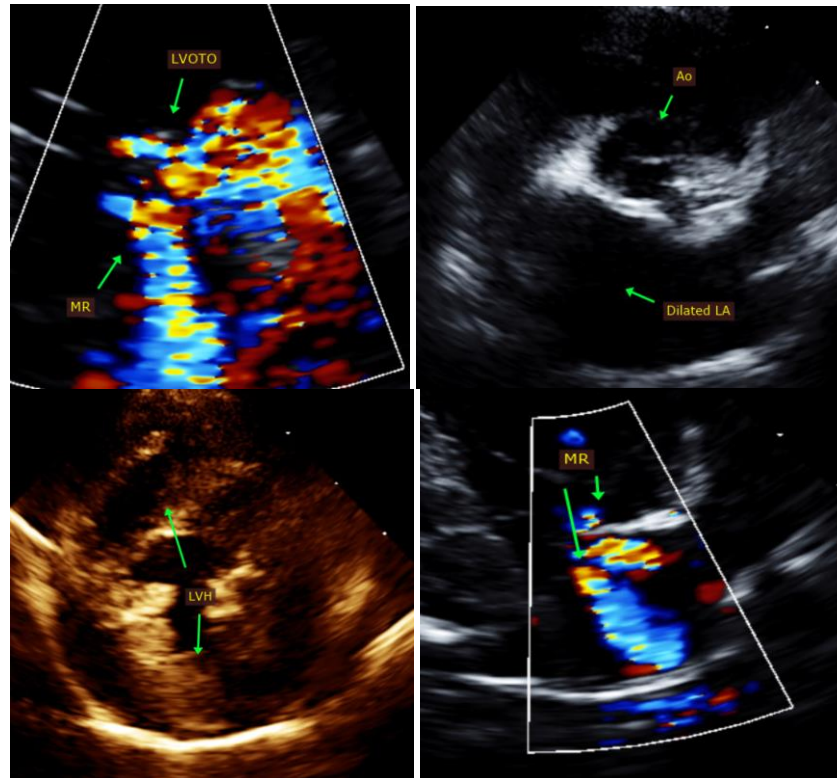
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**IMAGES**



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**  
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)  
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**Echocardiogram performed by:** Pamela Harrigan, RDCS  
Pet Animal Ultrasound Service (4paus.com)