



**PATIENT**

Raydar Rossman

**SPECIES**

Canine

**BREED**

Chihuahua (Longhair)

**SEX**

Spayed Female

**AGE**

9 Years 11 Months

**WEIGHT**

8 Pounds

**INTERPRETED BY**

Lisa Carioto, DVM,  
DVSc, Diplomate  
ACVIM

**IMAGING PERFORMED BY**

Dr. Alex McFeely

**HOSPITAL NAME**

Straley Vet Associates

**REFERRING VET**

Dr. Alex McFeely

**INVOICE**

38715

**DATE**

6/14/22

**PRESENTING CLINICAL SIGNS**

Raydar presented today for cardiac ultrasound recheck exam. Previous ultrasound was performed on 12/16/22 (compensated MMVD) and Raydar is currently on furosemide 6.25 mg furosemide PO BID and pimobendan 0.625 mg PO BID. Owner remarked that she is currently coughing more than normal, and mild crackles were appreciated bilaterally today during auscultation of lungs. Raydar was given 0.7 mg butorphanol IV to lightly sedate for u/s today, and her BP was normal, ranging from 130/97 (113) to 144/77 (93) mmHg systolic/ diastolic (MAP).

**ULTRASONOGRAPHIC EXAMINATION OF THE HEART**

CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (Boon method)	LA/AO (Heart Base; Swedish)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
PATIENT	At least 1.8	NM	2.1	1.50 (underestimated ; angle not ideal)	35	NM	0.11
CANINE CARDIAC PARAMETERS	HR (BPM)	AV VMAX (m/s)	PV MAX (m/s)	BODY WEIGHT (kg)	LA (2D long 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				
PATIENT	NM	1.01	0.59	3.64	2.25	2.58	1.67

Adapted from June Boon, Veterinary Echocardiography, 1998  
Sisson D et al. JVIM 1991; 5: 232, and Jacobs et al. Am J Vet Res 1985; 46:1705

**Current dosages of medications**

pimobendan 0.625 mg PO BID = 0.17 mg/kg  
furosemide 6.25 mg furosemide PO BID = 1.7 mg/kg

**Echocardiographic findings**

*Mitral valve*

- Mild (posterior) to moderate (septal) thickening and irregularity; consistent with myxomatous degeneration of both leaflets.
- Moderate prolapse of both leaflets.
- Mitral regurgitation.
- Marked left atrial enlargement
- Moderate rounding of the interventricular septum, i.e. left ventricular enlargement is present
- Moderate to marked increase of LA: Ao ratio
- LA normalized for BW (LAN = 1.45); moderate to marked LAE
- LVIDd normalized for BW (LVIDND = 1.8); moderate LVE



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- LVIDs normalized for BW (LVIDNs = 1.11); high end of normal

*Aortic valve*

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- No abnormalities
- No aortic insufficiency

*Tricuspid valve*

**BREED**

Chihuahua (Longhair)

- Mild myxomatous degeneration of both leaflets
- Mild to moderate prolapse of posterior leaflet.
- Tricuspid regurgitation.
- No right ventricular or atrial enlargement.

**SEX**

Spayed Female

*Pulmonic valve*

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- No abnormalities
- No pulmonary insufficiency.
- Main pulmonary artery within normal limits.
- Pulmonary artery - bifurcation, no abnormalities.
- Pulmonary artery: aortic ratio within normal limits.

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*Other*

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- No signs of pericardial or pleural effusion
- Rare “B” lines, suggestive of pulmonary edema.
- No obvious signs of a mass.
- Endocardium and myocardium: No obvious abnormalities.

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**ULTRASONOGRAPHIC FINDINGS**

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- Myxomatous degeneration of the mitral (moderate) and tricuspid (mild) valves, ACVIM stage C (i.e. currently suffering from congestive heart failure). Moderate to marked left atrial enlargement and moderate left ventricular enlargement. Rare “B lines” are suggestive of pulmonary edema or pulmonary infiltrates with fluid, cellular material (inflammation).

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- Physical examination revealed crackles on thoracic auscultation, therefore pulmonary edema is the most likely cause.
- Note, evaluation of Raydar’s diet is suggested, i.e. exclude grain free and all meat diets.

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- Sinus arrhythmia during the echocardiogram, however, a single premature contraction was possibly observed.

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- Arterial blood pressure measured this morning - WNL



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**INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

Other suggestions/recommendations include

- Evaluation of blood pressure – measured this morning; WNL
- Adjustments in medications
- pimobendan (Vetmedin 1.25 mg/capsule).
  - Increase the dose to 1.25 mg PO every 12 hours, i.e. equivalent to 0.25-0.30 mg/kg PO every 12 hours.
  - Vetmedin tablets are strongly recommended, rather than compounded medications. Liquid formulations are not stable.
  - If sensitive GI system, the dose may be increased to 0.625 mg in the morning and 1.25 mg in the evening.
  - Administer with a small amount of food to decrease nausea.
- benazepril – introduction of an ACEI is suggested in approximately 1 week, after ensuring Raydar tolerates the higher dose of pimobendan.
  - 0.25 mg/kg PO every 24 hours for 3 days, then
  - 0.25 mg/kg PO every 12 hours thereafter.
- furosemide – Increase the dose to 6.25 mg PO three times a day (does not have to be exactly every 8 hours) for 3 days, and then return to every 12 hours.
  - Administer the minimum dose effective in controlling clinical signs, including the cough.
  - A larger dose may be required at night, or dosing three times a day may be required.
- An antitussive, codeine or hydrocodone, may help control the cough if the latter is not associated with pulmonary edema.
- spironolactone (0.5-1 mg/kg) is helpful in decreasing the dose of furosemide required to control one's cough and is potassium sparing. It also has anti-fibrotic effects.
- Monitoring of the resting (sleeping) respiratory rate (RRR) is highly recommended once a day. The RRR should NOT EXCEED 30 breaths per minute (bpm). If the respiratory rate is greater than 30 bpm, or if there is a gradual increase (over a day or two) toward



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30 bpm, the patient should be evaluated immediately for congestive heart failure and the appropriate treatment initiated.

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- Other clinical signs clients should monitor for include coughing (particularly at night), fatigue, lethargy, decreased exercise tolerance (i.e., not being able to walk for as long before becoming tired, or “running out of breath” while playing, or going up and down stairs, as well as syncope (collapsing or fainting spells). Restlessness, or agitation during the night, or being unable to find a comfortable position to sleep are also very common clinical signs.

**BREED**

Chihuahua (Longhair)

- Moderate salt restriction is suggested (between 0.4-0.5 grams/1000 kcal of food). Monitor salt content in treats.

**SEX**

Spayed Female

- Omega-3 fatty acids may be helpful (EPA = 40 mg/kg/day and DHA = 25 mg/kg/day); gradual up-titration of the dose is suggested to decrease risk of gastrointestinal effects. However, they should not be introduced at the same time as benazepril.

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- Blood work, PCV/TS, serum biochemical profile, including a SDMA, and arterial blood pressure, are suggested 7-10 days after achieving the maximum dose of benazepril to ensure renal parameters have not increased more than 25%.

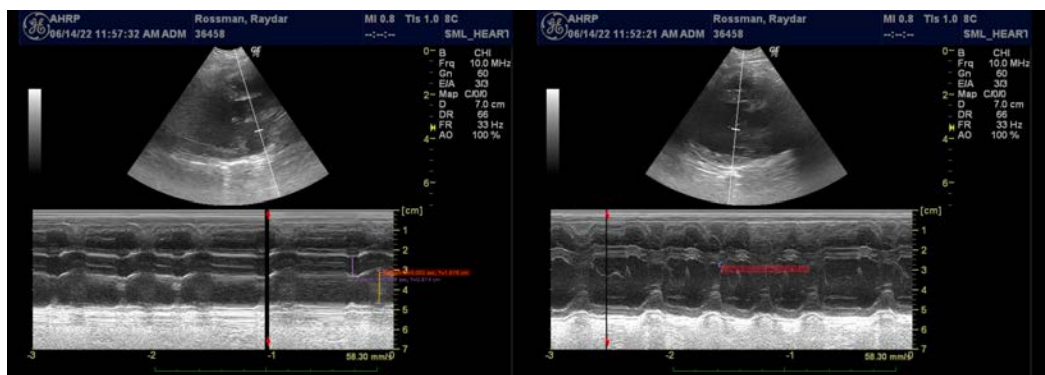
**WEIGHT**

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- Blood work is then recommended at least twice a year to monitor renal parameters. CBC, serum biochemical profile, including a SDMA, and arterial blood pressure
- Re-evaluation of an echocardiogram is suggested in 6 months, or sooner depending on clinical signs.

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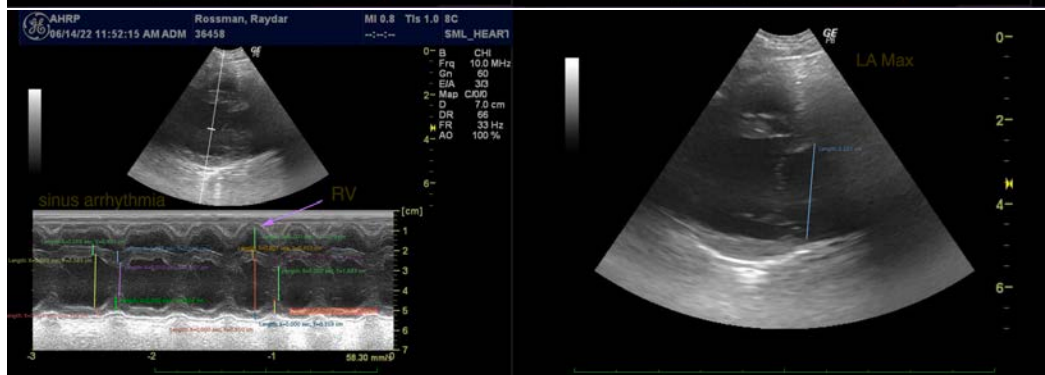


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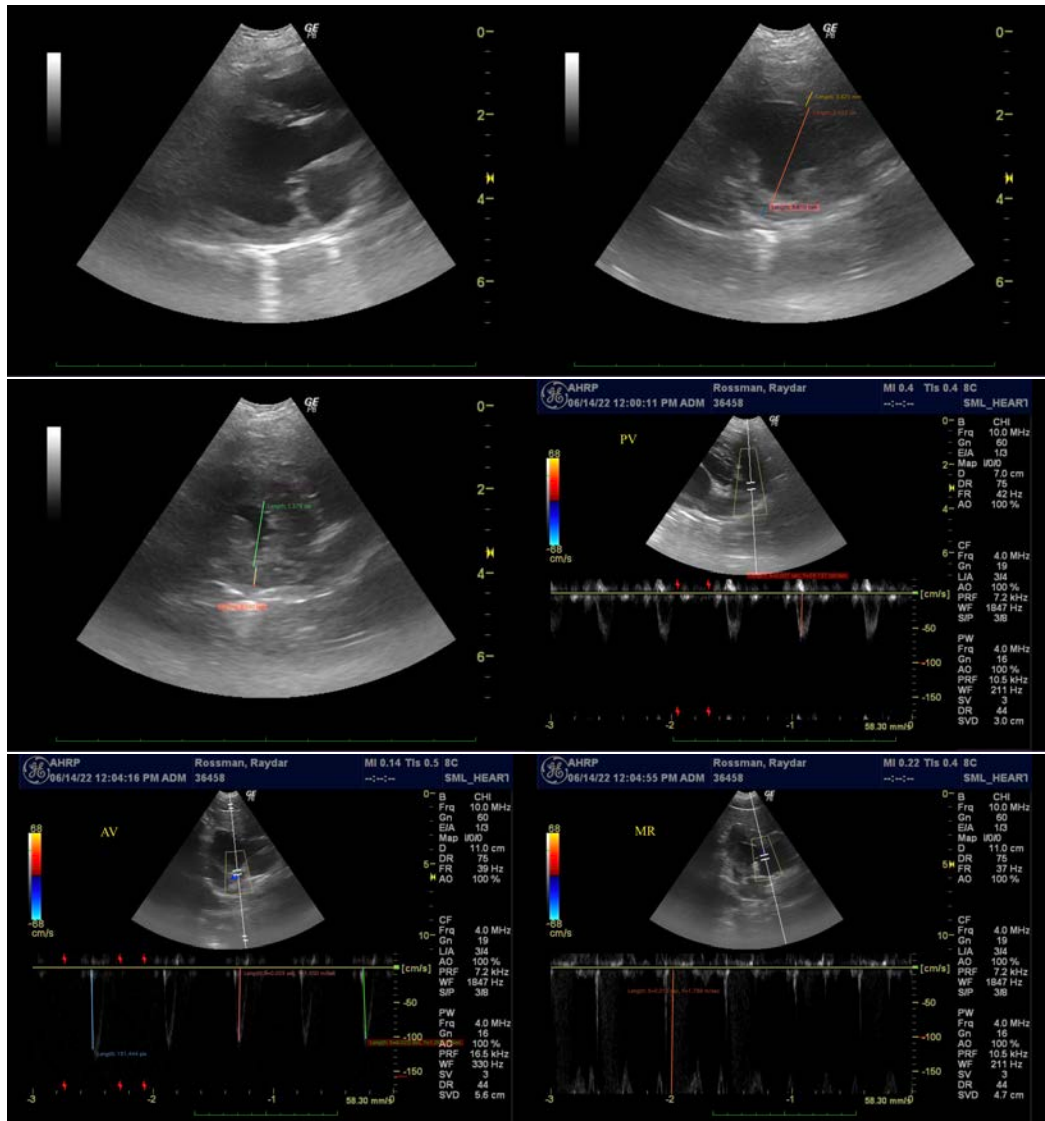
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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

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