


PATIENT PRESENTING CLINICAL SIGNS

Tribble McIlisley

P presents with a deep-chested cough. O reports P was diagnosed with a heart murmur by a previous veterinarian. P was prescribed Enalapril 2.5mg SID and Furosemide 12.5mg BID.

SPECIES

Abnormal PE/Chem/CBC/UA Results: CBC/Chemistry - K+ 3.6, ALP 171, ALT 120 Blood Pressure Measurements 106.4/87.4 (91.8) Current Medications Furosemide 12.5mg BID, Enalapril 2.5mg SID

Canine

ULTRASONOGRAPHIC EXAMINATION OF THE HEART
BREED

Pomeranian

SEX

Spayed Female

AGE

11 Years

WEIGHT

11.25 Pounds

INTERPRETED BY

 Lisa Carioto, DVM,
 DVSc, Diplomate
 ACVIM

IMAGING PERFORMED BY

Sara Hansen

HOSPITAL NAME

H & H Veterinary Care

REFERRING VET

Dr. Henery

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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	4.68	0.61	1.55	1.45	39	Not measured (NM)	0.18
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	125	1.17	0.71	5.51	2.21	2.61	1.60

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

Electrocardiogram (lead II)

Arrhythmia with multifocal and multiforme premature ventricular beats, and fusion beats.

Significant respiratory arrhythmia

Echocardiographic findings

- **Mitral valve:** Mild to moderate myxomatous degeneration of both leaflets. The septal leaflet is more severely affected compared to the posterior leaflet.
- Mild to moderate prolapse of both leaflets.
- Moderate mitral regurgitation.
- Mild to moderate left auricular enlargement.
- LA: Ao ratio = within normal limits to very mildly increased depending on method used
- LA normalized for BW (LAN = 1.23; mild to moderate enlargement))



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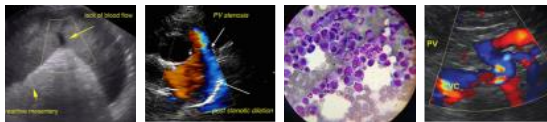
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- LVIDd normalized for BW (LVIDND = 1.6 (high normal))
- LVIDs normalized for BW (LVIDNs = 0.94 (WNL))
- *Aortic valve*: very mild thickening and irregularity of the leaflets
- *Aortic insufficiency*: absent
- *Tricuspid valve*: very mild to mild myxomatous degeneration of the tricuspid valve. The septal leaflet is more severely affected compared to the posterior leaflet.
- Very mild to mild prolapse of septal leaflet.
- Trivial to very mild tricuspid regurgitation.
- No right ventricular or atrial enlargement.
- *Pulmonic valve*: no abnormalities
- *Pulmonary insufficiency*: trivial
- *Pulmonary artery* - bifurcation, no abnormalities.
- *Pulmonary artery*: aortic ratio within normal limits.
- *Main pulmonary artery* within normal limits.
- No signs of heart worm.
- No signs of pericardial or pleural effusion
- *Pulmonary veins*, no abnormalities.
- No evidence of pulmonary edema.
- No obvious signs of a mass.
- The myocardium of the left ventricular free wall is mildly to moderately hyperechoic, including both papillary muscles.

ULTRASONOGRAPHIC FINDINGS

- Myxomatous degeneration of the mitral (mild to moderate) and tricuspid valves (very mild to mild), ACVIM stage B2. The results may be falsely decreased due to the current dose of furosemide and mild hypovolemia.
- Premature ventricular contractions, which is not the most common arrhythmia with myxomatous degeneration of the mitral (mild to moderate) and tricuspid valves. Hypoxia, ischemia and fibrosis of the myocardium are possible causes.
- Tribble's blood pressure is slightly decreased for a stressed dog in a veterinary clinic, i.e. assuming results are approximately 25-30 mmHg lower in her home environment.
- There are no obvious signs of congestive heart failure based on the ultrasound findings. Tribble's cough may be due to compression of the mainstem bronchus due to left atrial



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Tribble McIlisley

enlargement. Other causes may include tracheal collapse, as well as chronic bronchitis. All disease processes may occur concurrently in small breed dogs.

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Treatment with pimobendan is recommended despite the fact that Tribble's results do not meet all the criteria of EPIC study (see below).

BREED

Pomeranian

Other suggestions/recommendations include:

SEX

Spayed Female

- A decrease in the furosemide dose is recommended, i.e. the goal of the medication would be to maintain him on the *minimum* dose that is effective in controlling his clinical signs, i.e. maintaining a resting (sleeping) respiratory rate below 30 breaths per minute, controlling a cough, preventing agitation and/or restlessness at night. For example, decrease to 10 mg PO q12h for 3 days, then 5 mg in the morning and 10 mg in the evening for 3 days, then 5 mg PO q12h thereafter.

AGE

11 Years

- Hydrocodone may be considered to help decrease the severity of Tribble's cough, for example, 0.22-0.5 mg/kg PO q8-12h. Butorphanol may be administered if hydrocodone is not available at 0.1-0.2 mg/kg PO q12h.

WEIGHT

11.25 Pounds

- Evaluation of blood work, including a CBC, serum biochemical profile, SDMA and a urinalysis. If renal parameters are elevated, the dose of the ACEI should be decreased by 15-25%.

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- Treatment with pimobendan at 0.25-0.30 mg/kg PO every 12 hours, however, the dose should be started at 0.10 mg/kg PO every 12 hours for 3 days prior to increasing to the full dose to help decrease the risk of GI upset. Administer with a small amount of food to decrease nausea.

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Sara Hansen

- 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 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.

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- Mild salt restriction is suggested (less than 0.9 grams/1000 kcal of food)

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- 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. Pimobendan and omega-3 fatty acids should not be introduced at the same time.

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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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