



**PATIENT PRESENTING CLINICAL SIGNS**

**Gizmo Garcia** History: Patient presents for echo due to coughing non-stop - especially in the morning, wheezing, enlarged heart, heart failure. Meds: Benazapril 5 mgs 1/2 tab BID, Vetmedin 5 mgs BID.

**SPECIES ULTRASONOGRAPHIC EXAMINATION OF THE HEART**

Canine

BREED	CANINE	MR	TR	LA/AO	LA/AO	FS	EF	EPSS
Chihuahua	<b>CARDIAC PARAMETERS</b>	<b>VMAX</b> (m/s)	<b>VMAX</b> (m/s)	(Boon method)	(Heart Base; Swedish)	(%)	(%)	(cm)
<b>SEX</b>	NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
Neutered male	<b>PATIENT</b>	2.3	4.1	1.28	1.1	49	NM	Paradoxical motion of IVS due to RVE
<b>AGE</b>	CANINE	<b>HR</b> (BPM)	<b>AV VMAX</b> (m/s)	<b>PV MAX</b> (m/s)	<b>BODY WEIGHT</b> kg	<b>LA</b> 2D long axis Base view	<b>LVIDd</b> Avg; 2D and m-mode short axis	<b>LVIDs</b> Avg; 2D and m-mode short axis
12 years	<b>CARDIAC</b>							
<b>WEIGHT</b>	NORMAL PARAMETER	50-100	0.7-1.7	0.7-1.6				
10.84 lbs	<b>PATIENT</b>	116	1.5	1.2	4.93	2.14	1.93	0.98
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								

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**REFERRING VET**

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**Echocardiographic findings**

- **Mitral valve:** mild to moderate myxomatous degeneration of both leaflets. The anterior leaflet is more severely affected compared to the posterior leaflet.
- Mild prolapse of both leaflets.
- Marked mitral regurgitation.
- Very mild left auricular enlargement.
- LA: Ao ratio within normal limits
- LA normalized for BW (LAN = 1.24 (mild to moderately enlarged))
- LVIDd normalized for BW (LVIDND = 1.21 (WNL))
- LVIDs normalized for BW (LVIDNS = 0.59 (decreased))
- Pseudohypertrophy of the left ventricle
- **Aortic valve:** thin, smooth and regular leaflets



<b>PATIENT</b>	
Gizmo Garcia	<ul style="list-style-type: none"> <li>Aortic insufficiency: trivial</li> <li><i>Tricuspid valve</i>: mild myxomatous degeneration of the tricuspid valve. High index of suspicion of mild tricuspid valve dysplasia, with the anterior leaflet being longer than normal and slightly “hooked”.</li> </ul>
<b>SPECIES</b>	
Canine	<ul style="list-style-type: none"> <li>Mild prolapse of both leaflets.</li> <li>Marked tricuspid regurgitation.</li> </ul>
<b>BREED</b>	
Chihuahua	<ul style="list-style-type: none"> <li>Pulmonary hypertension: severe</li> <li><i>Pulmonic valve</i>: dysplasia and stenosis of the annulus and a portion of the main pulmonary artery, followed by dilation post stenosis.</li> </ul>
<b>SEX</b>	
Neutered male	<ul style="list-style-type: none"> <li>Severe pulmonary insufficiency.</li> <li>Pulmonary artery - post dilation</li> <li>Pulmonary artery (3.32 mm): aortic (1.16 mm) ratio = 2.86, severely abnormal</li> </ul>
<b>AGE</b>	
12 years	<ul style="list-style-type: none"> <li>The aorta and pulmonary artery are equal post stenosis</li> <li>Moderate right ventricular enlargement with flattening of the interventricular septum (RVIDd = 0.82 cm)</li> </ul>
<b>WEIGHT</b>	
10.84 lbs	<ul style="list-style-type: none"> <li>Moderate to marked atrial and auricular enlargement</li> <li>Dilation of the cranial vena cava</li> <li>No signs of heart worm.</li> <li>No signs of pericardial or pleural effusion</li> <li>No evidence of pulmonary edema.</li> <li>No obvious signs of a mass.</li> <li>Possible patent foramen ovale, however, a more in-depth evaluation of Doppler would be required.</li> </ul>
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<b>HOSPITAL NAME</b>	<b>ULTRASONOGRAPHIC FINDINGS</b>
Westwood Regional VH	<ul style="list-style-type: none"> <li>Pulmonic stenosis with stenosis of the annulus and a portion of the pulmonary artery and post-stenotic dilation. Severe pulmonic insufficiency, pulmonary hypertension, and right ventricular enlargement, as well as flattening of the interventricular septum.</li> <li>Myxomatous degeneration of the mitral and tricuspid valves, with pseudohypertrophy of the left ventricle and mild to moderate enlargement of the left atrium.</li> </ul>
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<b>DATE</b>	
5/23/22	<ul style="list-style-type: none"> <li>Colour Doppler picked up a possible patent foramen ovale, however, additional images would be required to confirm this suspicion.</li> </ul>



**PATIENT**

Gizmo Garcia

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Neutered male

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**INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

The following are suggested/recommended:

- Evaluation of blood pressure to ensure not hypotensive
- benazepril: Continue treatment if not hypotensive. Although rare, some dogs may experience coughing as an adverse reaction to benazepril. The dose may be decreased by 50-75% for a few days to determine if there is an improvement (decrease) in Gizmo's cough.
- pimobendan (Vetmedin): the normal dose is 0.25-0.3 mg/kg PO every 12 hours. Gizmo should be receiving 1.25 mg PO every 12 hours. Discontinue the medication for 3 days and restart it at 0.75 mg (1/2 of a capsule) PO every 12 hours thereafter. Although pimobendan is indicated for the myxomatous degeneration, it may not be tolerated as a result of the pulmonic stenosis. Note, pimobendan in liquid form is not stable. Capsules may be mixed in (no salt) broth to camouflage the taste or mixed with canned food, or the powder may be reformulated into empty gelatin capsules.
- Do not change the dose of the benazepril and pimobendan at the same time, i.e. separate the two treatments by 3-5 days to assess response to therapy.
- Sildenafil (Viagra or Revatio) is strongly recommended to treat the pulmonary hypertension. This medication will likely be the most effective in controlling Gizmo's cough. The dose should be slowly increased to decrease the risk of hypotension. For example, 0.25 mg/kg PO every 8 hours 3-5 days, then 0.5 mg/kg PO every 8 hours 3-5 days, then 0.75 mg/kg PO every 8 hours 3-5 days, then 1 mg/kg PO every 8 hours thereafter. The dose may be increased to 3 mg/kg PO q8-12 h, however, hypotension, nausea, vomiting and diarrhea may occur and the dose should always be gradually increased. Three times a day therapy is more effective, however, twice a day therapy may be given if necessary.
- Hydrocodone or butorphanol is suggested to help decrease tracheal irritation and secondary inflammation. Codeine is another option, but more difficult to dose in a dog of Gizmo's stature.
- 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.
- 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.
- Mild to moderate salt restriction is suggested (less than 0.9 grams/1000 kcal of food, and ideally 0.4-0.5 grams/1000 kcal of food)
- Monitoring for progression of heart disease with a re-evaluation of an echocardiogram every 6 months, or sooner if clinical signs develop, is recommended.



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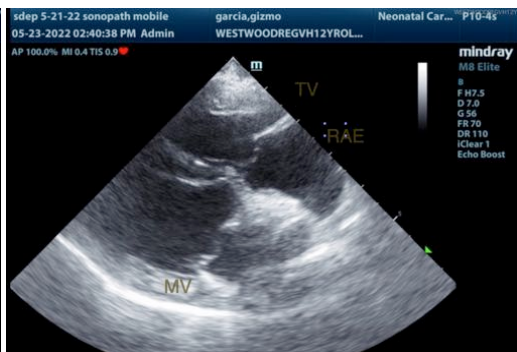
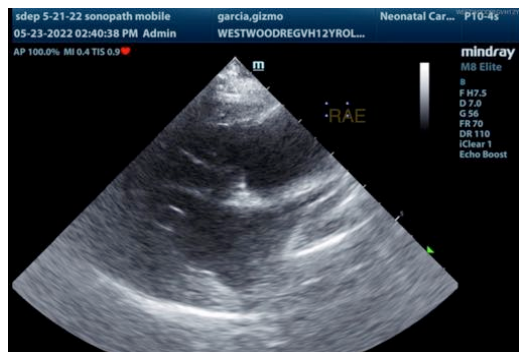
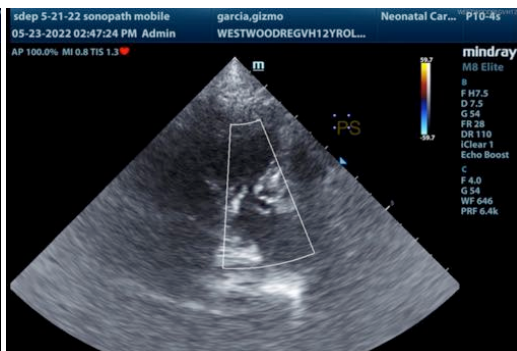
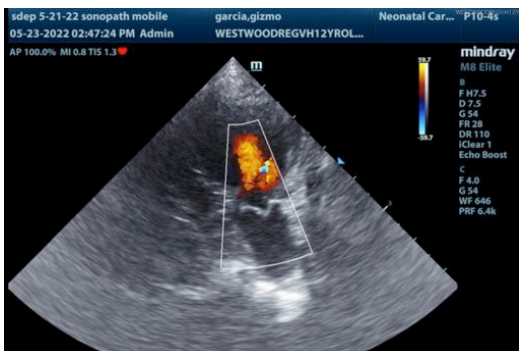
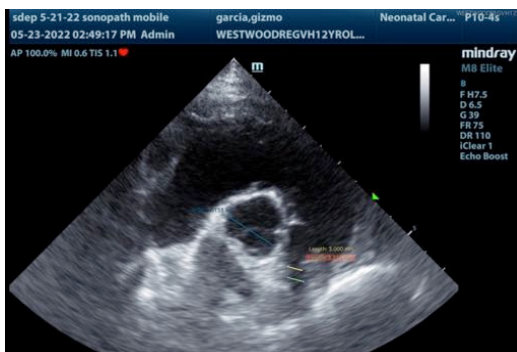
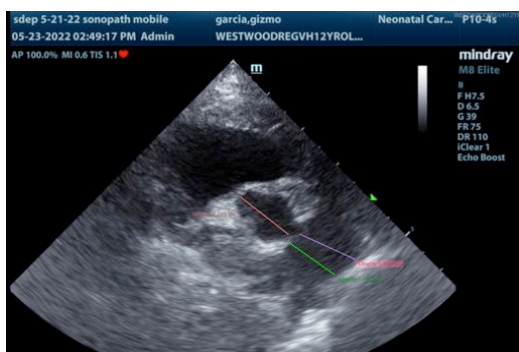
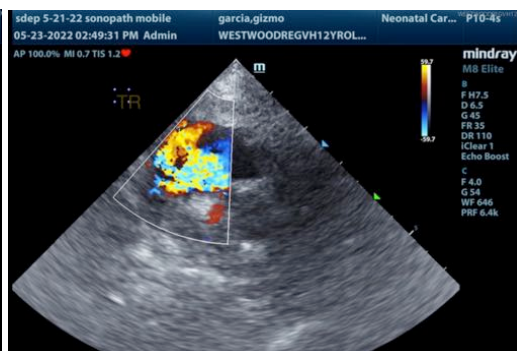
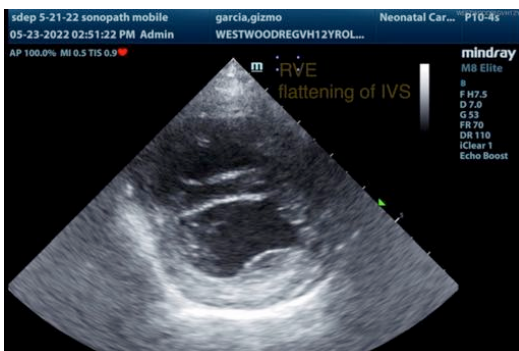
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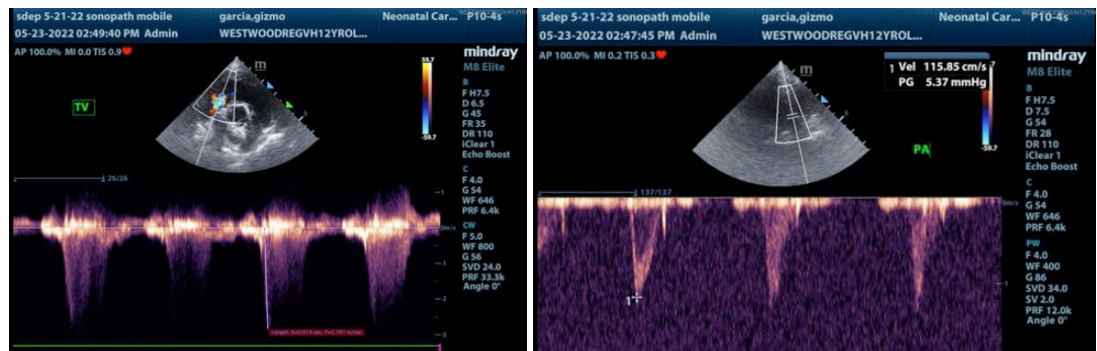
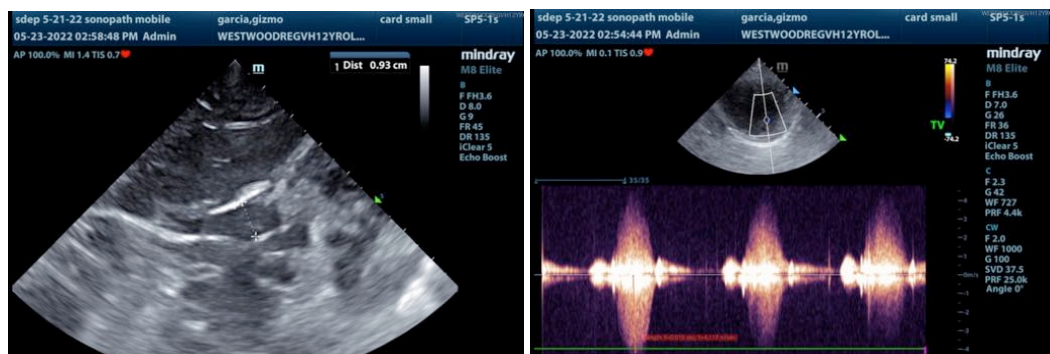
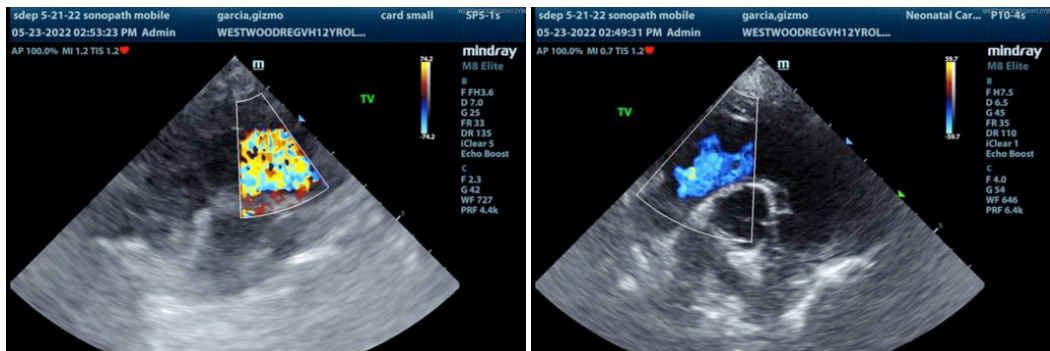
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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

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