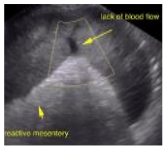
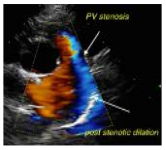
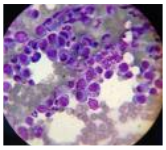
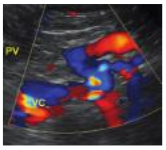
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™

SonoPath.com
1-800-838-4268 info@sonopath.com

**PATIENT**
Ringo Brien

**SPECIES**
Canine

**BREED**
Chihuahua

**SEX**
Male Neutered

**AGE**
15 years

**WEIGHT**
12.2lbs

**INTERPRETED BY**
Maggie Machen Lamy, DVM, DACVIM (Cardiology)

**IMAGING PERFORMED BY**
Kelly Romero

**HOSPITAL NAME**
Mulnix Animal Hospital

**REFERRING VET**
Dr. Thomas

**INVOICE**
21288

**DATE**
9/29/21

## PRESENTING CLINICAL SIGNS

History: Recheck echo. Patient has been doing well, although losing a small amount of weight gradually. Grade V/VI systolic heart murmur with intermittent arrhythmia.
-Blood pressure median was 155/91, mean 105 with a pulse of 78 on a dinamap.
-Current medications: Pimobendan.
-Pertinent previous echo findings (1/2021 MML): Moderate MR, moderate LAE, mild LVE, no TR. LA: 2.5, LV: 3.4.

## ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.

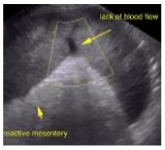
A single lead ECG is attached throughout the study with several loops of recordings. Findings include an underlying sinus rhythm with an appropriate heart rate; however, brief sinus pauses followed by a suspect escape focus are identified. Additionally, frequent isolated and couplet APCs are noted. No sustained runs of SVT or appreciated. No ventricular premature beats are seen.
ECG diagnosis: Suspect early Sick Sinus Syndrome/Sinus Node Dysfunction with inappropriate sinus pauses, escape foci and supraventricular arrythmias.

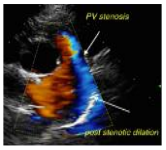
## ECHOCARDIOGRAM FINDINGS

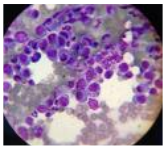
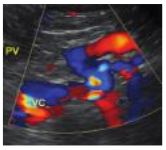
2D, m-mode, color flow and doppler imaging is available. Diffuse thickening of mitral valve leaflets (anterior>posterior) with mild prolapse into the left atrial lumen. Moderate eccentric mitral regurgitation with moderate left atrial dilation. Normal MR velocity. Moderately increased LV diameter with hyperdynamic myocardial function. The tricuspid valve appears subjectively normal, with trace tricuspid regurgitation. Normal velocity. Normal right atrial and ventricular diameter. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities. No aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No cardiac tumors observed.

## CARDIAC CHART

| CANINE CARDIAC PARAMETERS | MR VMAX (m/s) | TR VMAX (m/s) | LA/AO (Boon method) | LA/AO (Heart Base; Swe) | FS (%) | EF (%) | EPSS (cm) |
|---|---|---|---|---|---|---|---|
| NORMAL PARAMETER | 4.5-5.5 | <2.7 | 1.3 | <1.6 | 28-40 | 40-100 | <0.6 |
| PATIENT | 5.4 | 2.1 | 1.88 | 1.8 | 50 | 83 | 0.24 |
| **CANINE CARDIAC PARAMETERS** | **HR** (BPM) | **AV VMAX** (m/s) | **PV MAX** (m/s) | **BODY WEIGHT** (kg) | **LA** 2D short 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 | BELOW | BELOW | BELOW | BELOW |
| PATIENT | NM | 0.86 | 0.68 | 5.5 | 2.6 | 4.0 | 2.0 |
| *Normal chamber parameters expressed as a mean value (SD) | | | | 3 | 1.27 (5.3) | 2.46 (2.46) | 1.36 (5.5) |
| **BODY WEIGHT DEPENDENT PARAMETERS** *Note: All measurements based upon multi-modal images and methods. An average value is reported.* Adapted from June Boon, Veterinary Echocardiography, 1998 Rishniw M and Hollis NE, J Vet Intern Med 2000; 14:429-435 | | | | 5 | 1.40 (4.5) | 2.74 (5.2) | 1.60 (4.7) |
| | | | | 10 | 1.50 (3.8) | 3.27 (3.5) | 2.06 (3.1) |
| | | | | 15 | 1.83 (2.0) | 3.71 (2.4) | 2.43 (2.1) |
| | | | | 20 | 2.02 (1.9) | 4.14 (2.2) | 2.80 (2.0) |
| | | | | 25 | 2.18 (2.4) | 4.48 (2.9) | 3.10 (2.5) |
| | | | | 30 | 2.33 (3.3) | 4.83 (3.9) | 3.39 (3.4) |



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|---|---|---|---|---|
| Hansson et al, Vet Rad and Ultrasound 2002<br>Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995 | 35 | 2.48 (4.3) | 5.17 (5.0) | 3.69 (4.5) |
| | 40 | 2.62 (5.2) | 5.48 (6.1) | 3.96 (5.4) |
| | 50 | 2.88 (7.1) | 6.07 (8.3) | 4.46 (7.4) |

## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Chronic degenerative valve disease persists with evidence of slight progression. While the quantitative volume of MR and LA enlargement are unchanged, the LV is progressively dilated. Additionally, a small tricuspid leak is noted. No additional structural issues are identified.

The attached ECG is suspicious for Sick Sinus Syndrome (SSS), which is a form of sinus node dysfunction. The diagnosis of SSS is based upon inappropriate sinus node function (pauses) in addition to supraventricular arrhythmias (APCs). The other rule out would be APCs with concurrent high vagal tone, which is also a possibility. SSS is typically idiopathic in origin, with progressive deterioration of the electrical system resulting in persistent bradycardia/sinus arrest, significant lethargy and collapse. Other possible contributing factors such as high vagal tone, electrolyte abnormalities, Addison's disease, etc. should also be ruled out.

Typically, SSS heart rates range from bradycardia to tachycardia as seen here, making medical therapy difficult to utilize safely. Given the dramatic rate oscillation, an atropine challenge is not recommended at this time. Treatment of bradycardia (heart rate stimulants) can exacerbate inappropriate tachycardia. Highly recommend a holter monitor (can be ordered through Sonopath), and/or referral to a Cardiologist to determine the full extent of the arrhythmia. Consultation for possible treatment options (medical and/or surgical) will depend upon holter results. The first sign of progression would be fainting/syncopal episodes. An alternative to holter/referral in an asymptomatic dog would be simple monitoring at home with referral once symptoms develop. Discussion with the owner is advised. If not recently performed, screening lab work is highly recommended to rule out metabolic derangements, Addison's, etc.

**Elective sedation/anesthesia is not advised prior to further arrhythmia evaluation**

Continue Pimobendan as prescribed with no obvious indication for additional medications. Monitor for development of a cough, labored breathing, exercise intolerance **or collapse episodes.** Patient is at risk for progression to clinical signs and/or sudden death in the future.

## PLAN

If not recently performed, screening lab work is highly recommended to rule out metabolic derangements, Addison's, etc. Consider holter placement and/or referral for further evaluation v monitoring. Close monitoring for associated clinical signs (progressive lethargy, collapse) is advised. Pending results/plan/progression, recheck ECG in 3-4 months to screen for progression, sooner if episodes occur in the interim.

Recommend conservative monitoring with a recheck echocardiogram in 6 months to sooner for progression.

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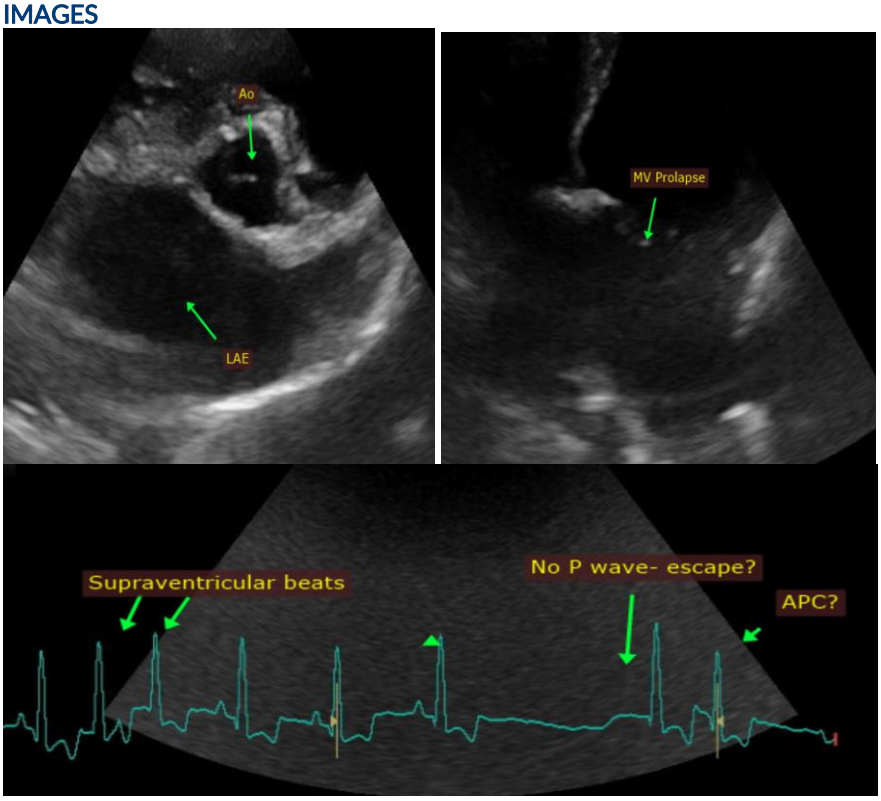
## IMAGES




**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)**
info@sonopath.com