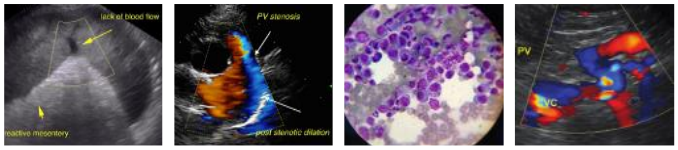
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



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

PATIENT
Deacon Holland

SPECIES
Canine

BREED
Cane Corso

SEX
MI

AGE
5mo

WEIGHT
82lbs

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

IMAGING PERFORMED BY
Dianne McFadden, CVT

HOSPITAL NAME
Rockaway AH

REFERRING VET
Dr. Bednar

INVOICE
24974

DATE
6/24/2022

PRESENTING CLINICAL SIGNS
History: Suspect CHF. Arrhythmia on exam. On Lasix
Abnormal PE/Chem/CBC/UA Results: anemia, ALT incr 114, GGT incr 3

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.
Normal cardiac silhouette. No obvious evidence of CHF.

ELECTROCARDIOGRAPHIC FINDINGS *Note: Single lead ECGs are evaluated as a rhythm strip. Morphology/MEA cannot be definitively commented on.
A single lead ECG is available; 25mm/s, 20mm/mV. The average heart rate is 100bpm (range 65-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. No ectopic beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with respiratory variation.

A six lead ECG is available at 25mm/s; 20mm/mV. The average heart rate is 100bpm (range 65-150bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P wave morphology is positive with a normal dimension. Normal PR. The QRS morphology is positive with normal dimension. MEA is normal. No ectopic beats, pauses or dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with respiratory variation.

ECHOCARDIOGRAM FINDINGS
2D, m-mode, color flow and doppler imaging is available. The left ventricular wall is severely hypertrophied (1.5cm globally). There is a diffusely hyperechoic endocardium consistent with fibrosis. Papillary muscle hypertrophy. The left atrium is severely enlarged. The right atrium is mildly enlarged. The right ventricle appears normal. The mitral valve is dysplastic, with an elongated and thickened anterior leaflet that is suspected to prolapse into the LVOT in systole (kissing lesion visualized). There is moderate eccentric mitral regurgitation secondary to the abnormal motion. The tricuspid valve appears mildly thickened with mild TR. Blood flow through the LVOT is severely elevated and turbulent with a sub aortic narrowing visualized (see below). The aortic valve appears largely normal with moderate aortic insufficiency. No obvious shunts. No evidence of cardiac tumors or metastatic lesions on this scan. No pleural or pericardial effusion seen. Rapid irregular rate/rhythm throughout.

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	5.2		1.7	2.2	44	76	0.4
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		6.7		37	3.7	3.4	
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)

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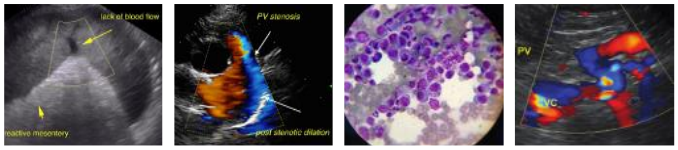

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BODY WEIGHT DEPENDENT PARAMETERS

**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
Hansson et al, Vet Rad and Ultrasound 2002
Bonagura et al. Echocardiography: principles of interpretation, Vet Clin North Am 15:1177, 1995

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)
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

Complex congenital heart disease is present. The most significant finding appears to be severe subaortic stenosis causing an increased flow velocity through the LVOT and aortic valve. There is also mitral valve dysplasia that is likely contributing to the obstruction and causing a mitral leak. Additionally a small tricuspid regurgitation is identified with mild right heart enlargemt. **Highly recommend referral in this complicated case with rapid arrhythmias for advanced echocardiography, ecg monitoring, treatment and hospitalization. The degree of disease is severe, with LV hypertrophy and severe LA dilation at a very young age. This is no doubt exacerbated by the arrhythmia, with a rapid HR and irregular rhythm noted. The importance of a screening ECG cannot be stressed enough in order to definitively diagnose the arrhythmia. Without treatment we will not be able to get the congestion controlled despite diuretic therapy. If atrial fibrillation (AF) is confirmed, rate control must be instituted in order to get the rate and secondary congestion under control (typically using Diltiazem +/- Digoxin). Ventricular arrhythmias are also possible, which would warrant alternative therapy.**

The patient is reportedly in CHF, and chest radiographs are strongly recommended. If referral is declined, full cardiac support can be instituted as below; however, the ECG must be assessed to determine what additional therapy is warranted.

Monitor for development of labored breathing, exercise intolerance or collapse episodes, as SAS/AS patients are more predisposed to development of arrhythmias than to CHF. Mild exercise restriction is advised lifelong.

Prognosis is poor, with many severe AS/SAS patients succumbing to malignant arrhythmias as are seen here.

PLAN

Recommend immediate referral for advanced echo/ECG evaluation, hospitalization and treatment as discussed. If declined, a STAT ECG should be performed at a minimum to confirm what rhythm needs therapy. Additionally, institute Lasix 1-2mg/kg PO q12h. Institute Spironolactone 1-2mg/kg PO q12h. Pending ECG evaluation, sotalol or diltiazem is likely warranted.

If referral is declined, a recheck echocardiogram in 6 months to screen rate of progression, sooner if clinical issues arise.

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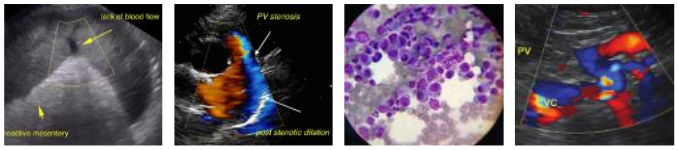

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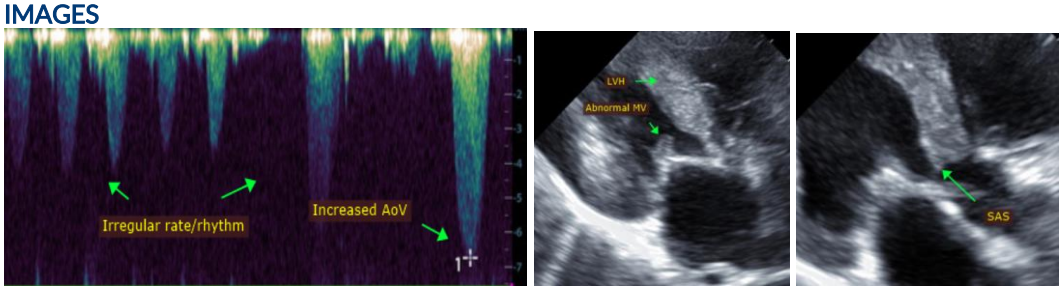
IMAGES



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. 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