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Clinical Sonography & Telecytology
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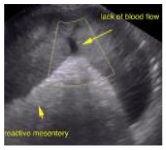

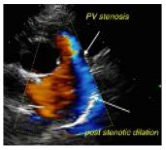

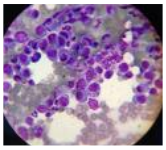
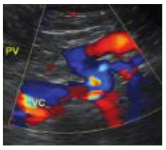

SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT
Duke Abate

SPECIES
Canine

BREED
Great Pyrenees

SEX
Male Neutered

AGE
10 years

WEIGHT
94.8lbs

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

IMAGING PERFORMED BY
Dana Alterman, RDCS, LVT

HOSPITAL NAME
Eubank Animal Clinic

REFERRING VET
Dr. Smith

INVOICE
21328

DATE
10/4/21

PRESENTING CLINICAL SIGNS
History: Arrhythmia.

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 150bpm (range 115-200bpm). No identifiable P waves with an irregularly irregular rhythm, most consistent with atrial fibrillation.
ECG diagnosis: Atrial fibrillation.

ECHOCARDIOGRAM FINDINGS
2D, m-mode, color flow and doppler imaging is available. Mild diffuse thickening of mitral valve leaflets with no prolapse into the left atrial lumen. No mitral regurgitation with no left atrial dilation. Normal LV diameter with borderline myocardial function (highly dependent on prior cycle length). The tricuspid valve appears normal with no tricuspid regurgitation. Normal right atrial and ventricular diameter and morphology indicating no overt evidence of pulmonary arterial hypertension. The pulmonic and aortic valves are normal in morphology and mobility. Normal pulmonic and aortic outflow velocities with laminar flow. No obvious aortic or pulmonic insufficiency. No pericardial or pleural effusion noted. No obvious cardiac masses.

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	NA	NA	NM	1.3	28	50	NM
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	1.0	0.7	43.0	3.6	5.4	3.9
*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				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)
**Note: All measurements based upon multi-modal images and methods. An average value is reported.*				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)

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

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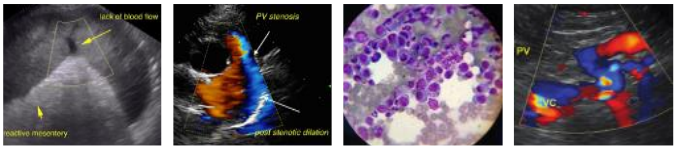

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Overtly normal cardiac structure and function. The LV function borders on mildly depressed; however, 2 important factors affecting systolic function are at play here. First is heart rate which is highly variable with AF; after longer diastolic filling periods the function is improved and vice versa. Second is AF implies a lack of coordinated ventricular contraction, which will also mildly depress fractional shortening. No significant valve regurgitation is seen, and the LA is normal.

Given a lack of LA dilation and a relatively normal heart rate, the arrhythmia is presumably lone or primary atrial fibrillation. Giant breed dogs are predisposed to primary AF, which develops simply due to a relatively large myocardial size (also common in horses). The difference between lone AF and a malignant AF that develops secondary to structural disease is heart rate and atrial dimension; lone AF is typically a normal rate, while structural AF is rapid and >200bpm, often accompanying acute congestive signs. Given a lack of structural disease, systemic abnormalities or clinical signs, this is the presumed diagnosis. Dogs with lone AF typically exhibit minimal clinical signs if the rate is normal and can often remain asymptomatic for some time with this abnormal rhythm. That being said, many lone AF dogs will eventually develop DCM down the road and long-term prognosis is guarded. Lifelong monitoring is advised. Electrical conversion can be considered in some sustained cases depending on activity level of the patient but is typically not necessary. Mild activity restriction is advised.

Going forward, no medications are clearly indicated at this time. That being said, if the owner is compliant and conservative, there is potentially some long-term benefit to Pimobendan in this case and this would be a reasonable approach. An alternative approach would be simple monitoring in an asymptomatic dog. If the latter approach is elected, institution of the medication will be indicated should the systolic function worsen, LA dilation develop, or the patient experience any related clinical signs such as lethargy/exercise intolerance. Rate control is certainly not indicated in this case, with a resting rate of 120bpm. Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit. Ensure that grain free/boutique/exotic ingredient diets are avoided in this case lifelong.

Anesthetic risk is considered mild if needed. A baseline BP should be assessed prior to proceeding. Cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction, isoflurane gas) are recommended. Pre-oxygenate for 5-10 minutes prior to induction. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Mild IV fluid restriction is recommended to avoid fluid overload. Avoid heart rate stimulating drugs such as atropine unless clinically indicated.

PLAN

Baseline BP. Monitor at home for collapse, exercise intolerance, and/or lethargy and reassess HR/ECG if any changes develop.

Recheck ECG and Echocardiogram in 6 months, sooner if clinical signs occur in the interim.

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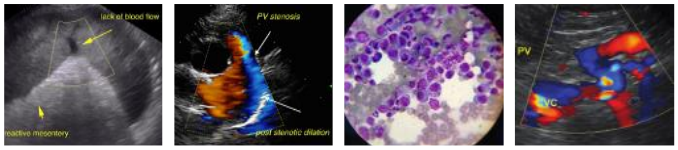

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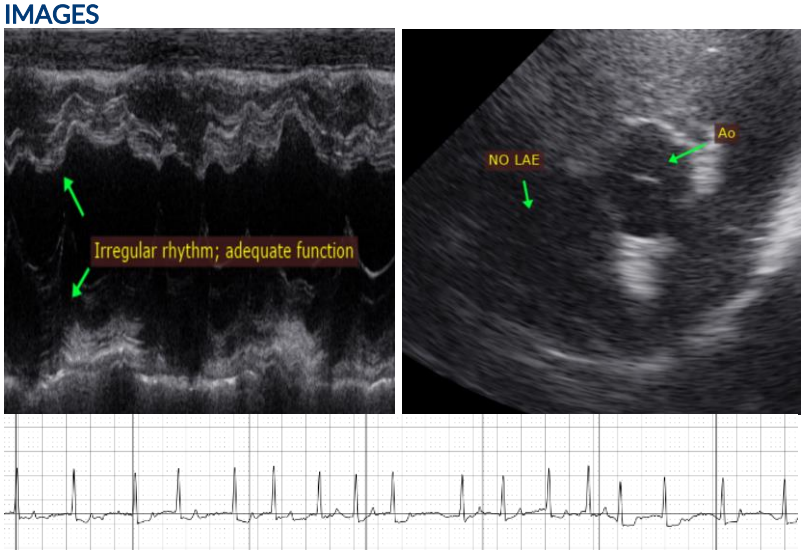
IMAGES



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. 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