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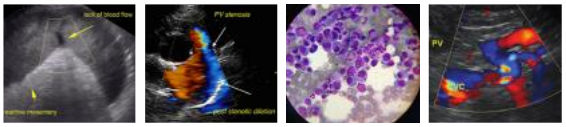


ANIMAL SOUNDS NW
MOBILE VETERINARY ULTRASOUND
IMAGING PERFORMED BY
AnimalSoundsNW.com 541-357-9423

PATIENT
Sri Mathews

SPECIES
Canine

BREED
Dachshund

SEX
Male Neutered

AGE
14 years

WEIGHT
13.9lbs

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

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
Aumsville Animal Clinic

REFERRING VET
Dr. Rowland

INVOICE
22455

DATE
2/9/22

PRESENTING CLINICAL SIGNS

History: Grade 3/6 murmur heard left side of chest. Abnormal rhythm with occasional skipped beats. Assess prior to potential anesthesia.
-Abnormal PE/Chem/CBC/UA Results: ProBNP=1482.

RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.

Mild cardiomegaly with a rounded appearance. No obvious evidence of CHF.

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

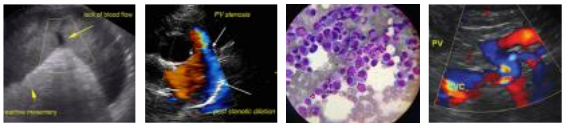
A single lead ECG is available; 50mm/s, 10mm/mV. The average heart rate is 100bpm (range 63-167bpm). The underlying rhythm is sinus in origin, with profound rate variation. Brief pauses throughout followed by a junctional escape beat consistent with sinus arrest.
ECG diagnosis: Normal sinus rhythm with periods of sinus arrest and escape foci; r/o high vagal tone v SSS.

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. Mild central mitral regurgitation. Normal left atrial dimension. No LV dilation with adequate myocardial function. LV wall thickness is normal. The tricuspid valve appears subjectively normal, with no tricuspid regurgitation. Normal right atrial and ventricular diameter and morphology indicating no overt evidence of pulmonary arterial hypertension. The pulmonic valve is normal in morphology and mobility. Normal pulmonic outflow velocity with laminar flow. No pulmonic insufficiency. The aortic valve is thickened with mild to moderate aortic insufficiency. There is moderate aortic stenosis present (54mmHg PG). No pericardial or pleural effusion noted.

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	NA	0.9	0.9	41	75	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	3.7	0.7	6.3	1.5	2.9	1.7
*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)
				10	1.50 (3.8)	3.27 (3.5)	2.06 (3.1)
Adapted from June Boon, Veterinary Echocardiography, 1998				15	1.83 (2.0)	3.71 (2.4)	2.43 (2.1)



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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	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

The cause of the murmur is moderate aortic stenosis causing an increased flow velocity through the orifice. The aortic valve appears thickened with a small leak, which suggests a valvular issue. Fortunately, there is no evidence of compensatory LV hypertrophy at this time; however, this should be monitored closely going forward. The LA is normal indicating the risk for complication is currently low. A small mitral leak is appreciated which likely reflects early valve disease, monitoring for progression is advised.

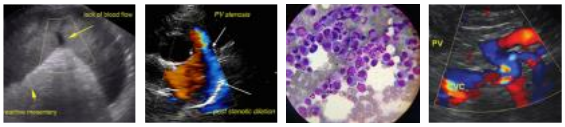
Valvular AS is most often congenital; however, the finding of a new murmur is atypical in a senior dog. Acquired disease is highly uncommon, particularly in asymptomatic dogs without a history of a fever or signs of infection. Infectious endocarditis is always a rule out for a newly stenotic aortic valve; however, there is no obvious vegetative lesion present, and this patient is reportedly healthy. Calcification of the aortic valve is common in humans (rare in dogs) and screening a systemic calcium level seems reasonable in this patient as a part of full baseline lab work.

With a moderate stenosis, the prognosis is fair until we can assess progression in LV compensatory changes. Rate control is typically indicated to help lower heart rate and decrease the obstruction using atenolol. That being said, in a senior dog with a bradyarrhythmia, this is neither necessary or advised. Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit. Monitor for development of labored breathing, exercise intolerance or collapse episodes, as AS patients are more predisposed to development of arrhythmias than to CHF. Mild exercise restriction is advised lifelong.

The ECG does show an irregular sinus rate with frequent pauses and escape beats. These findings may simply be due to profound high vagal tone; however, early sinus node dysfunction should be ruled out. Sick Sinus Syndrome (SSS) is relatively rare in this signalment, and high vagal tone is suspected (particularly given a chronic respiratory patient). Further evaluation via an atropine challenge and/or holter monitor is recommended, particularly prior to sedation or anesthesia. An atropine challenge would be the next step (administer 0.04mg/kg atropine IV or IM and assess response); pending a normal response (heart rate doubles and maintains for 10-15 minutes) high vagal tone is diagnosed which is a benign cause. High vagal tone can be a normal variant or be secondary to a variety of systemic issues such as neurologic or respiratory disease. An abnormal response would indicate sinus node dysfunction, and a holter monitor and/or possible referral should be considered.

Monitor at home for any associated clinical signs, including fainting/exercise intolerance, changes in breathing pattern or development of a cough.

From a structural standpoint, anesthetic risk is considered mild if needed. **This does NOT take into account the arrhythmia, which must be further evaluated through an Atropine prior to proceeding.** Assuming an Atropine response is normal, 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,



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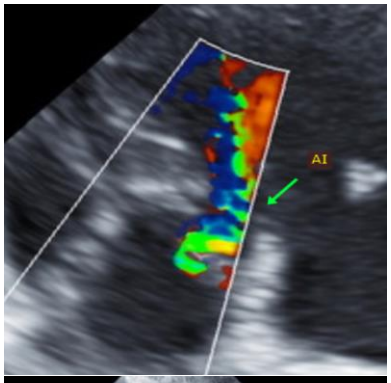
hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Mild IV fluid restriction is recommended to avoid fluid overload. Aortic abnormalities carry an increased risk for endocarditis, and **prophylactic antibiotics are recommended for any orthopedic or dental procedure.**

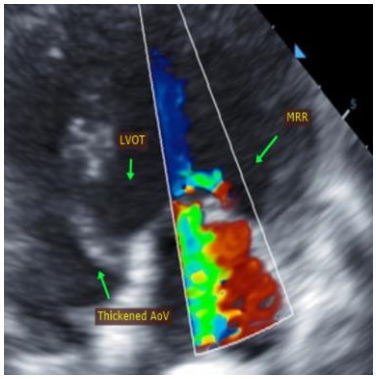
PLAN

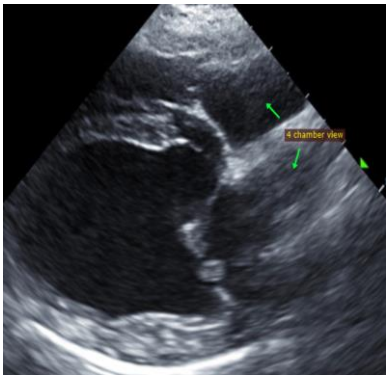
Consider an Atropine Challenge and/or holter monitor.

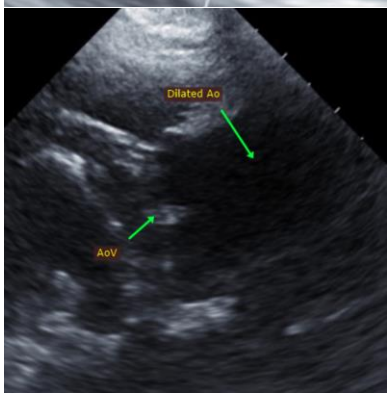
Recheck echocardiogram recommended in 6 months, sooner if any clinical signs develop.

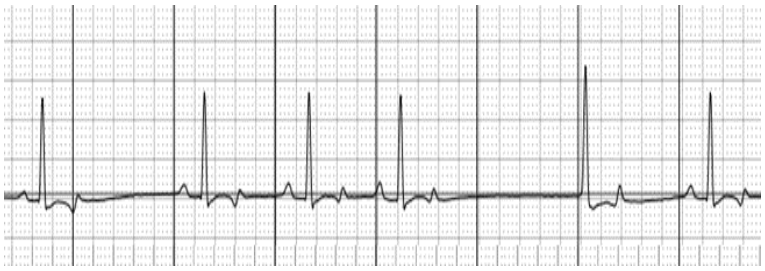
IMAGES











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
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