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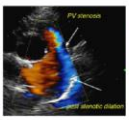
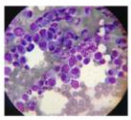
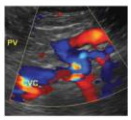

SonoPath
Clinical Sonography & Telecytology
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PATIENT
Pickle Bode

SPECIES
Canine

BREED
Australian Shepherd

SEX
Male Neutered

AGE
14 years

WEIGHT
52lbs

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

IMAGING PERFORMED BY
Rachel Runnells, RVT

HOSPITAL NAME
SVS Imaging KC

REFERRING VET
Dr. Hall

INVOICE
24760

DATE
6/13/22

PRESENTING CLINICAL SIGNS
History: Presented for coughing. Has had a heart murmur for a while, but now it is grade 4/6.
-Abnormal PE/Chem/CBC/UA Results: CBC WNL. Chem BUN 33, Creat 1.5 and SDMA 11. ProBNP 3,670.
-Current medications: On medication for hypothyroidism and is controlled. Has cognitive dysfunction and is on several meds for that-more over the counter meds. Senelife, b/d food, etc.
*AUS showed abdominal mass.

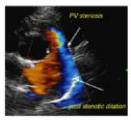
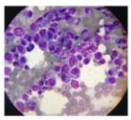
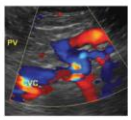
RADIOGRAPHIC FINDINGS *NOTE: Images submitted for supplemental cardiac information only.
Mild cardiomegaly. No obvious evidence of CHF.

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, 10mm/mV. The average heart rate is 100bpm (range 71-125bpm). The rhythm is sinus in origin, with a p for every QRS complex and vice versa. The P and QRS morphologies are positive. Isolated VPCs noted; three in a 30 second tracing; monomorphic, singles only. No supraventricular premature beats, pauses or other dysrhythmias observed.
ECG diagnosis: Normal sinus rhythm with respiratory variation. Isolated VPCs.

ECHOCARDIOGRAM FINDINGS
2D, m-mode, color flow and doppler imaging is available. Large heterogenous echogenicity mass associated with the aortic root; 4.2 x 5.5cm in best viewed cross section. The mass is well encapsulated and near the bifurcation overlying the aorta. No obstruction to blood flow is seen or imposition of cardiac chambers. There is moderate eccentric mitral regurgitation, thickened mitral valve with mild obvious prolapse. LV function is low normal. Left atrium is moderately dilated, although the mass obscures standard measurement. LV is mildly dilated with adequate function. Mildly thickened TV with mild TR; velocity consistent with early pulmonary hypertension. Normal right heart chamber dimensions. The pulmonic and aortic valves are normal in appearance. Normal LVOT and RVOT velocity. No AI or PI identified. No pericardial or pleural effusion.

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	6.1	3.0	NM	1.8	44	76	0.3
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	113	1.3	1.2	23.6	3.9	3.8	2.1
*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.*				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)

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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	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 murmur is due to chronic degenerative valve disease causing moderate mitral and mild tricuspid regurgitation. Moderate left atrial enlargement indicates the current risk for complication is low but may progress in the future. Moderate pulmonary hypertension, which should be monitored going forward.

Of equal importance, there is suspect cardiac neoplasia associated with the heart base. The most likely tumor type given this location is a chemodectoma; however, other more malignant differentials cannot be ruled out (particularly in light of abdominal findings). Chemodectomas are often incidental findings as is suspected to be the case here, only causing clinical signs if blood flow is obstructed, pericardial effusion occurs, or a metastatic lesion causing systemic issues. It is difficult to definitively evaluate the mass peripherally (i.e., cannot rule out peripheral obstruction of flow through distal PA's) and a CT may be helpful to screen for true extent.

The prognosis with cardiac chemodectomas is fair. The limiting factor is often hemorrhage into the pericardium, impingement of cardiac blood flow secondary to tumor growth, or metastasis to the thorax or abdomen. Chemotherapy and/or radiation therapy can also be discussed with an Oncologist.

Given these findings, the mass may certainly be contributing to a cough symptom. The cough may progress as the tumor grows, particularly should chamber imposition develop. Should the tumor increase in dimension and lead to congestion, this is most commonly right-sided congestion (ascites/effusions) with increasing pulmonary pressures and syncope with exertion. Monitoring is advised.

The ECG shows isolated ventricular premature contractions (VPCs). VPCs are generated from abnormal conductive or fibrotic tissue in the ventricles of the heart muscle, and even frequent single VPCs will often cause no clinical signs in dogs. When sustained however, ventricular tachycardia can lead to symptoms such as lethargy and collapse.

While VPCs are non-specific, this patient has several reasons for their generation (structural disease, a cardiac tumor, abdominal pathology, stress). Given only single beats identified, no treatment is warranted and simple follow up is advised.

Continued cough management is recommended using more aggressive Hydrocodone, a course of Baytril, a trial of Theophylline, etc.

Given the totality of the findings, recommend Pimobendan in this case as below. Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes. Omega fatty acid supplementation and mild salt restriction may be of some long-term benefit. Monitor for development of a cough, labored breathing, exercise intolerance or collapse episodes. Prognosis is guarded long-term.

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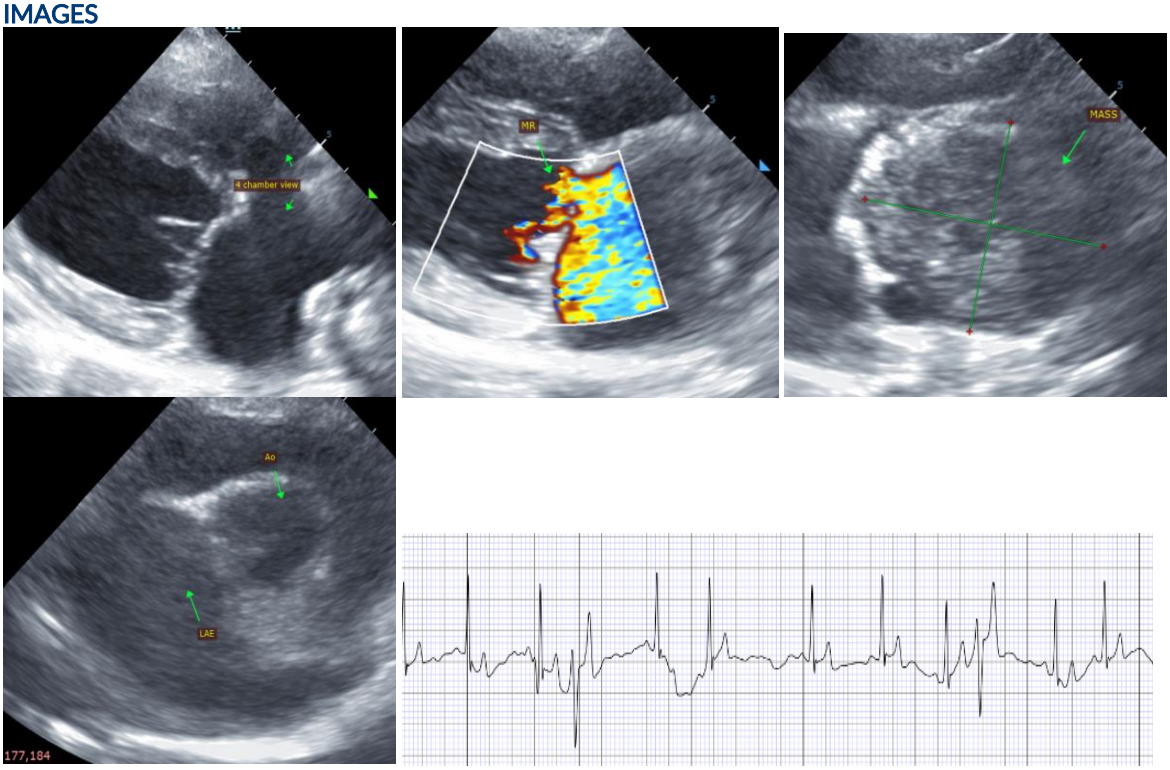
Anesthetic risk is considered moderately elevated if needed. Cardiac protective drug choices (opioid/benzodiazepine premedication, propofol or alfaxalone induction, isoflurane gas) are recommended. Pre-oxygenate for 5-10 minutes prior to induction. Monitor for arrhythmias, hypotension, and hypoxia both intra and post-operatively and intervene as necessary. Mild IV fluid restriction is recommended to avoid fluid overload. Recommend having lidocaine CRI available for use in the event of worsening ventricular arrhythmias under anesthesia (CRI 50—75mcg/kg/min).Avoid heart rate stimulating drugs such as atropine unless clinically indicated.

PLAN

Institute Pimobendan 0.3mg/kg PO q12h. Baseline BP recommended. Consider cough suppression as discussed. Consider further evaluation of tumor extent through thoracic CT as discussed.

Recheck tumor size via echocardiography in 6 months, sooner if clinical signs arise.

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