

PATIENT

SPECIES

Canine

BREED

Australian Shepherd

SEX

Neutered Male

AGE

11 Years

WEIGHT

53.6 Pounds

INTERPRETED BY

DVM,
DACVIM (Cardiology)

IMAGING
PERFORMED BY

Dr. Michael
Wasserman

HOSPITAL NAME

REFERRING VET

INVOICE

DATE

PRESENTING CLINICAL SIGNS

History: Purpose of echocardiogram: Evaluate for progression of MMVD, anesthetic recommendations for dental/COHAT, if lasix is indicated. Patient reported to be asymptomatic at home. Addisonian diagnosed several years prior and managed with physiologic daily prednisolone supplementation in combination with Zycortal injections administered approximately every 25 days. Patient weighs 53.6 lb (24.3 kg).

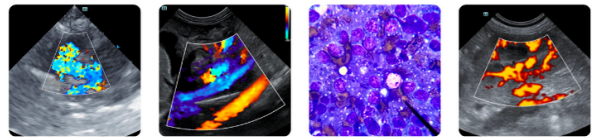
Current medications include prednisolone 0.5 mg PO SID (approximately 0.02 mg/kg PO SID), pimobendan (Vetmedin) 5 mg PO q12h (approximately 0.21 mg/kg PO q12h), and desoxycorticosterone pivalate (Zycortal) 25 mg/mL administered at 0.3 mL IM monthly (7.5 mg total dose; approximately 0.31 mg/kg IM q25–30 days).

Patient also has a documented cardiac murmur and has been receiving pimobendan therapy for the past several years. An echocardiogram performed by a mobile sonographer in June 2024 reportedly identified chronic myxomatous mitral valve disease with associated left atrial and left ventricular dilation.

Abnormal PE/Chem/CBC/UA Results: 5/18/26 labs: CBC within normal limits. Chemistry unremarkable. Electrolytes within normal limits (NA 142, K 5.3). TT4 2.4 ug/dL, fecal antigenDx negative for parasites. 4dx negative for heartworm and tickborne disease. 7.5/9 BCS Previous echocardiogram report attached. Today's 3v thoracic radiographs attached for supplemental review of evidence of CHF.

ULTRASONOGRAPHIC EXAMINATION OF THE HEART

CANINE CARDIAC PARAMETERS	LA long axis	LAMaxN	Ao long axis	LA/AO (Heart Base; Swe, short axis)	LA/AO long axis	LVIDd	LVIDdN
NORMAL PARAMETER		<1.57		<1.6	<2.5		<1.7
PATIENT	5.77	2.16	1.42	2.52	4.06	4.86	1.77
CARDIAC PARAMETERS	Body Weight (kg)	AV VMAX (m/s)	PV MAX (m/s)	MR VMAX (m/s)	TR VMAX (m/s)	FS (%)	LVIDsN
NORMAL PARAMETER		0.7-1.7	0.7-1.6			22 - 49%	<0.9
PATIENT	24.3	1.7	0.62	4.3	--	34.9	0.9
CARDIAC PARAMETERS	HR (bpm)	MV E (m/s)	MV A (m/s)	MV E/A (m/s)	EF (%)	IVSdN	LVFWdN



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NORMAL PARAMETER						<0.6	<0.6
PATIENT	85	1.0	0.52	1.9	64.2	0.36	0.35

Radiographic Interpretation

There is moderate cardiomegaly with specific left atrial left ventricular enlargement patterns. The visible pulmonary vasculature is normal in size. There is no evidence of cardiogenic pulmonary edema.

Cardiac Presentation

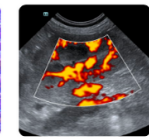
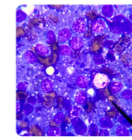
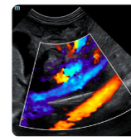
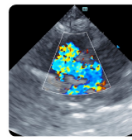
The mitral valve leaflets are mildly thickened with mild eccentric and posteriorly directed mitral valve insufficiency. There is mild bileaflet prolapse. The left atrium is severely dilated. The left ventricle is severely dilated. Normal global left ventricular systolic function. There is normal right atrial size with mild tricuspid regurgitation. There is no prolapse of the tricuspid valve leaflets. There is no evidence of clinically relevant pulmonary hypertension. The right ventricle subjectively appears normal in structure and function. The aortic and pulmonary valves have normal appearance and motion, and the corresponding outflow velocities are within normal limits. There is no evidence of pulmonary or aortic valve insufficiency. The aorta appears normal. The pulmonary artery and associated branches appear normal. There is no evidence of pleural effusion, pericardial effusion, or intracardiac masses.

ULTRASONOGRAPHIC FINDINGS

- Myxomatous mitral valve disease, stage B2 (severe LA and LV enlargement)
- Tricuspid valve insufficiency

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The echocardiogram showed evidence of myxomatous mitral valve disease. Based on this echocardiogram, there is severe left atrial and left ventricular enlargement. The patient would benefit from starting pimobendan (if not already started – target dose at least 0.3mg/kg q12 at this stage) to slow the progression of this disease and delay the onset of CHF. Though there are no reported clinical signs of CHF at this time based on the provided history and examination, thoracic radiographs are recommended to fully rule out CHF and obtain a baseline of the patient's pulmonary parenchyma for comparison should clinical signs develop in the future. If there is concern clinically or radiographically for CHF, furosemide should be started at ~2mg/kg PO q12hr pending assessment of renal function. There is no evidence of cardiogenic pulmonary edema based on the thoracic radiographs, and no clinical signs of congestive heart failure in the history. Given the severity of the left heart enlargement, the addition of an ACEi at 0.3-0.5 mg/kg PO q12 and spironolactone at 1-3 mg/kg PO q24 is recommended provided normal renal function and no other comorbidities that would preclude this therapy. Though the evidence for RAAS blockade prior to CHF is limited, this patient is likely to benefit based on the severe remodeling. A blood pressure is also recommended. If the systolic BP >160mmHg after ACEi therapy, amlodipine should be considered. Elevated BP worsens the mitral regurgitant fraction and leads to faster progression. Recheck in 2 weeks if ACEi/spironolactone and/or furosemide are started for a recheck renal panel with electrolytes and a



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blood pressure. Recheck every 6 months or sooner if concerns arise for a recheck echocardiogram to monitor for progression, BP and thoracic radiographs (strong recommendation if there is a new cough or increase in the RR).

Monitoring

It is very important to catch any clinical signs concerning for emerging CHF as early as possible. The client should be closely monitoring and ideally tracking the sleeping respiratory rate. The sleeping RR should be between 10-30 breaths per minute or less (ideally in the teens or low 20s). **If the resting RR is trending upward**, consistently >35/min while resting/sleeping AND/OR there is a new or progressive cough, the patient should be seen urgent for evaluation to determine if CHF is developing. *RECHECK ASAP for thoracic radiographs if there is a new cough or increase in RR to detect early CHF and avoid ER presentation**

Sodium Restriction

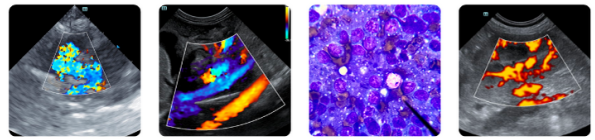
Moderate sodium restriction may be beneficial in managing this stage of cardiac disease. High-salt treats or diets should be avoided. If interested, further information on moderate sodium restricted diets for dogs with advanced cardiac disease can be found at: <https://heartsmart.vet.tufts.edu/nutrition/>.

Anesthesia

There is a moderately to severely increased risk to anesthesia given the underlying cardiac disease. Anesthesia should only be pursued for medically necessary procedures with client understanding of the risks.

On top of the increased intraoperative risks (hypotension, hypoventilation, hypothermia) with cardiac disease, there is an increased risk of precipitating CHF. With this understanding, anesthesia can be pursued pending normal labwork, with appropriate precautions for strictly necessary procedures. Baseline thoracic radiographs are recommended within 1-2 months of anesthesia, not only to rule out CHF, but to serve as a baseline for comparison if a new cough or other respiratory signs develop after anesthesia. Pimobendan can be given three times daily for 2-3 days prior to and following anesthesia to support cardiac function. The morning dose of any ACEi should be skipped the day of anesthesia. Recommendations for pre-operative sedation include an opiate (such as butorphanol) combined with a benzodiazepine (such as midazolam or diazepam). It is recommended to avoid alpha 2 agonists, as these agents can cause vasoconstriction and worsen MR, exacerbating left atrial hypertension. These effects persist for hours even after reversal. Etomidate or alfaxalone are preferred induction agents. Propofol can be considered for induction; however, is less preferred to alfaxalone or etomidate. Ketamine should ideally be avoided. Atropine should be used as needed for blood pressure support when bradycardia is present during periods of hypotension.

Full cardiac precautions should be taken with regards to monitoring (ideally CO2, SpO2, ECG, and BP



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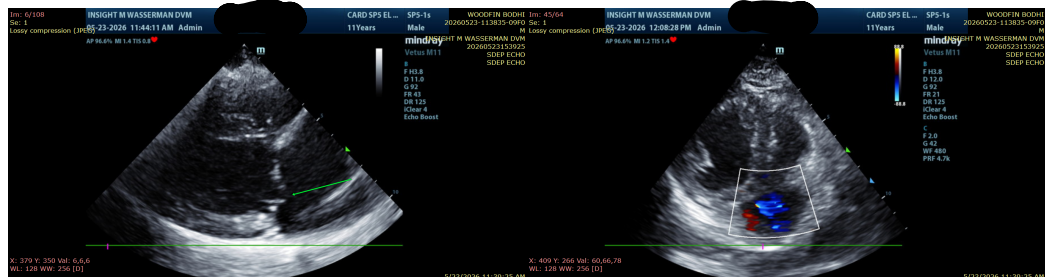
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monitoring) and judicious IV fluid administration (avoid volume overload or underload/hypotension – 1-2 mL/kg/hr surgical fluid rate is recommended). All other methods of blood pressure support should be utilized **instead of fluid boluses** (i.e. reduce inhalant/use MAC reducing agents, consider anticholinergics if bradycardia + hypotension), and the use of parenteral inotropes should be considered (i.e. dobutamine or dopamine).

Surgical Options

Historically, degenerative mitral valve disease in dogs has been managed with medical therapy aimed at controlling clinical signs and slowing progression. In recent years, surgical procedures have become available for select patients. Open-heart mitral valve repair is offered only at a small number of centers worldwide, including the University of Florida in the United States and specialized institutions in the UK and Japan, where the largest number of these procedures have been performed. While great success can be achieved with open-heart surgery, it involves notable cost, invasiveness, and travel to a center that offers these procedures. A less invasive option is transcatheter edge-to-edge repair (TEER), which uses a catheter-based approach to reduce mitral valve regurgitation without the need for open-heart surgery. This procedure is available only at select centers, with Colorado State University having completed the most TEER procedures in dogs to date. In addition, palliative procedures such as left atrial decompression (LAD) can be performed in certain cases, typically once medical therapy has been exhausted. These are not curative but may help relieve symptoms by reducing pressure within the left atrium and lungs, thereby improving comfort and quality of life for patients with advanced disease/end-stage CHF.



The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. 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.

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