



**PATIENT**

Yuki Hines

**PRESENTING CLINICAL SIGNS**

History: Grade 4/6 systolic murmur ausculted.  
-Sedation: Butorphanol.

**SPECIES**

Canine

**BREED**

Alaskan Malamute

**SEX**

Male Intact

**AGE**

5 months

**WEIGHT**

62.5lbs

**INTERPRETED BY**

Maggie Machen Lamy,  
DVM, DACVIM  
(Cardiology)

**IMAGING PERFORMED BY**

Tom McNeill

**HOSPITAL NAME**

SVS Imaging CT

**REFERRING VET**

Dr. Meyers

**INVOICE**

23682

**DATE**

4/14/22

**ECHOCARDIOGRAM FINDINGS**

2D, m-mode, color flow and doppler imaging is available. The mitral valve appears thickened and elongated with at least mild mitral regurgitation. No obvious prolapse into the left atrial lumen. The mitral valve can be seen obstructing flow through the LVOT consistent with systolic anterior motion. No left atrial dilation. Normal LV internal diameter with normal myocardial function. The left ventricular walls are mildly hypertrophied (1.2cm globally), consistent with pressure overload. Hypertrophied fibrotic papillary muscles. The endocardium appears fibrotic as well. Subaortic narrowing is visualized; however, this is difficult to delineate from the abnormal mitral valve. The aortic valve appears largely normal in form and function. An elevated LVOT velocity is documented, at least 3.3m/s; however, this is suspected to be an underestimation depending on heart rate. No obvious aortic insufficiency. The tricuspid valve appears normal, with no tricuspid regurgitation. Normal right atrial and ventricular diameter and morphology. The pulmonic valve is normal in morphology and mobility. Trace pulmonic insufficiency. Normal RVOT flow. No pericardial or pleural effusion noted. No cardiac tumors identified.

**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	NM	NM	1.4	1.1	51	84	0.58
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	100	3.3	1.1	28.3	3.0	3.0	1.5
*Normal chamber parameters expressed as a mean value (SD)				3	1.27 (5.3)	2.46 (2.46)	1.36 (5.5)
<b>BODY WEIGHT DEPENDENT PARAMETERS</b>				5	1.40 (4.5)	2.74 (5.2)	1.60 (4.7)
<i>*Note: All measurements based upon multi-modal images and methods. An average value is reported.</i>				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**

The cause of the murmur is mitral valve dysplasia causing an elevated blood flow velocity through the LVOT and aortic valve. A subaortic narrowing is not entirely ruled out in this image set. The velocity is indicative of only a mild pressure gradient (44mmHg); however, the degree of LV hypertrophy is more consistent with a moderate obstruction. The abnormal mitral valve

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(mitral valve dysplasia) is likely contributing to or causing the entire issue and the differentiation of the 2 does not change outcome or treatment. The obstruction will certainly be worse at elevated heart rates (patient is also sedated). No obvious additional issues are identified; however, it should be noted that small defects are easily missed in young animals. Referral for advanced imaging should always be considered in congenital cases (bubble study, angiogram, etc.).

**SPECIES**

Canine

Medical management through heart rate control is recommended as below, particularly given the dynamic component of the obstruction. Omega fatty acid supplementation may be of some long-term benefit.

**BREED**

Alaskan Malamute

Prognosis is guarded yet highly variable, with many dogs succumbing to malignant arrhythmias by mid-life and others maintaining asymptomatic status for some time. Serial echocardiography is recommended lifelong to assess for progression and risk for complication as the patient matures. Monitor for development of labored breathing, exercise intolerance or collapse episodes, as SAS patients are more predisposed to development of arrhythmias than to CHF.

**SEX**

Male Intact

Exercise restriction is advised lifelong.

**AGE**

5 months

Given a possible genetic link, breeding is not recommended.

**WEIGHT**

62.5lbs

Once atenolol is initiated, anesthetic risk is mild. Avoid heart rate stimulating drugs such as atropine or glycopyrrolate unless clinically indicated. Avoid ketamine and acepromazine due to systemic vascular effects. Mild IV fluid restriction is advised. Recommend prophylactic antibiotics for any orthopedic or dental procedure in the future given predisposition to endocarditis.

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

Consider referral. If declined, institute atenolol to effect: 0.5-1.5mg/kg SID-BID (up-titrate to desired effect). Goal is to suppress heart rate <130bpm even with stress/activity.

Recommend recheck echocardiogram in 6 months (or once full stature) to assess for progression.

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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.

**SPECIES**

Canine

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.

**BREED**

Alaskan Malamute

**Maggie Machen Lamy, DVM**  
Diplomate of the American College of Veterinary Internal Medicine (Cardiology)  
info@sonopath.com

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