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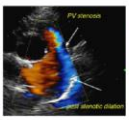
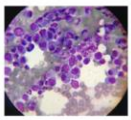
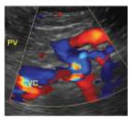
SVS IMAGING

SonoPath
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PATIENT

Rickie David

SPECIES

Canine

BREED

Coon Hound Mix

SEX

Male Neutered

AGE

1 year

WEIGHT

55lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Kamps

INVOICE

28140

DATE

1/6/23

PRESENTING CLINICAL SIGNS

History: Adopted 3 months ago with known heart murmur. Presented for recent wellness exam. 4/6 systolic heart murmur was noted with no clinical symptoms. Sent home with trazadone PRN. Sedated with 1ml IV butorphanol.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The left ventricular wall is mildly hypertrophied (1.3cm globally). There is a diffusely hyperechoic endocardium consistent with fibrosis. Papillary muscle hypertrophy. The left atrium is mildly enlarged (ratio falsely elevated due to small aortic root). The right atrium is normal in size. The right ventricle appears normal. The mitral valve is thickened, most consistent with dysplasia with suspicion for prolapse into the LVOT (visualization is limited). There is mild to moderate anterior-directed mitral regurgitation associated with this abnormal motion. Trace tricuspid regurgitation seen. Normal velocity. Blood flow through the LVOT is severely increased. The subaortic region is not extensively visualized; however, narrowing is suspected. Small aortic root. The aortic valve is mildly thickened and trileaflet. Moderate aortic insufficiency. Prominent coronary vessels. No obvious shunts. No evidence of cardiac tumors or metastatic lesions on this scan. No pleural or pericardial effusion seen.

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	6.8	2.5	1.6	1.6	50	92	0.5
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	96	6.3	1.4	24.9	3.3	4.0	2.0
*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

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The cause of the murmur is increased flow velocity through the LVOT and aortic valve. First, there is mitral valve dysplasia with a suspect secondary LVOT obstruction and mitral regurgitation. This is similar to SAM in a cat, with hypertrophy of the LV secondary to pressure overload caused by obstruction to flow. This type of obstruction tends to be heart rate

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dependent, with a dynamic profile. There is also some degree of sub-aortic stenosis suspected as well, due to the appearance of the LVOT (albeit the region is not extensively visualized). Finally, the aortic valve also appears mildly thickened, likely reflecting a primary valvular issue with moderate AI. There is mild LV hypertrophy present indicating pressure overload; however, the left atrium is normal indicating the risk for complication is currently low. No additional defects are seen; however, it should be mentioned that small defects/shunts are easily missed in congenital echocardiography. Referral should always be considered in congenital cases. If declined, reasonable to recheck once heart rate is controlled and patient is of full stature (6-12 months) to ensure additional defects are not present.

Lifelong heart rate control with atenolol is recommended, as the dynamic nature of the obstruction will be reduced at lower heart rates. No other medications are indicated at this juncture. Monitor for development of labored breathing, exercise intolerance or collapse episodes, as SAS/AS patients are more predisposed to development of arrhythmias than to CHF. Mild exercise restriction is advised lifelong.

Prognosis is guarded yet highly variable, with many severe AS/SAS patients succumbing by mid-life. My main concern in this case is LV hypertrophy is already present at 1 year of age, which will likely progress going forward. Follow up is highly recommended.

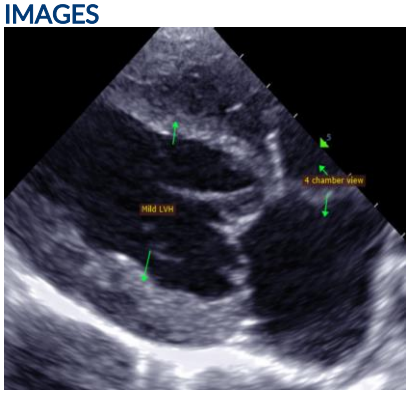
Once Atenolol is initiated, anesthetic risk is mild. Avoid heart rate stimulating drugs such as atropine or glycopyrrolate unless clinically indicated. Avoid ketamine and acepromazine due to systemic vascular effects. Mild IV fluid restriction is advised. Recommend prophylactic antibiotics for any orthopedic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

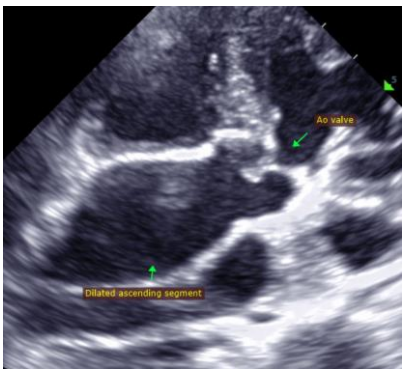
PLAN

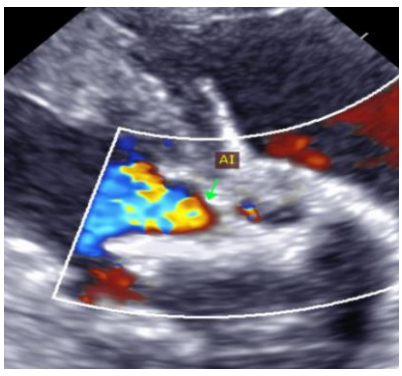
Consider referral in any congenital case for advanced imaging and discussion of possible treatment options. Administer titrating dose of atenolol: 25mg tablets; Give 1/2 tab once daily. Recheck heart rate in 1-2 weeks with target stressed rate of <140bpm, Increase as needed until target reached.

Recommend recheck echocardiogram in 6 months to assess response to atenolol and screen for small concurrent defects, sooner if clinical issues arise.

IMAGES







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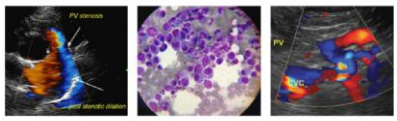

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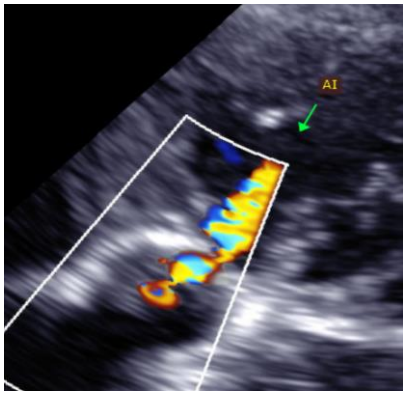

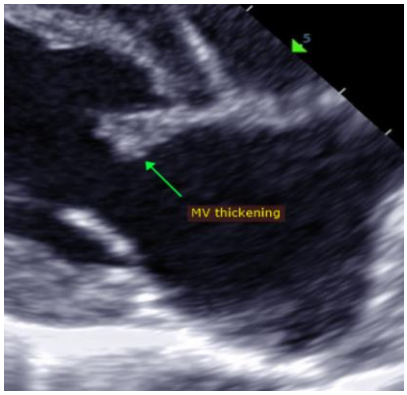

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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