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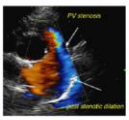
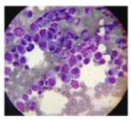
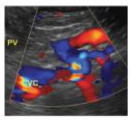
SVS IMAGING

SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

PATIENT

Duck Saso

SPECIES

Canine

BREED

German Shepherd

SEX

Male Intact

AGE

10 weeks

WEIGHT

9.6lbs

INTERPRETED BY

Maggie Machen Lamy, DVM, DACVIM (Cardiology)

IMAGING PERFORMED BY

Kim Liedberg

HOSPITAL NAME

SVS Imaging WI

REFERRING VET

Dr. Kamps

INVOICE

26176

DATE

9/2/22

PRESENTING CLINICAL SIGNS

History: Grade 5/6 bilateral systolic heart murmur was noted at 3 weeks of age. Trouble playing. Very lethargic and out of breath after a few minutes of play. Decreased appetite and is not growing as fast as littermates. Sedated with butorphanol

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. The left ventricular wall is severely hypertrophied (1.1cm globally). There is a markedly hyperechoic endocardium consistent with marked fibrosis. Moderate papillary muscle hypertrophy and fibrosis. The left atrium is mildly enlarged. The right atrium is normal in size. The right ventricle appears abnormal as well with evidence of hypertrophy. The mitral valve appears dysplastic, although difficult to visualize extensively. There is moderate mitral regurgitation likely associated with this abnormal anterior motion. Trace tricuspid regurgitation seen. Normal velocity. Blood flow through the LVOT is severely elevated. No obvious subaortic ridge is seen although the LVOT is not extensively visualized. The aortic valve is abnormal and appears stenotic. Mild aortic insufficiency. The RVOT velocity is mildly increased with a dynamic profile. 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	5.0	2.0	NM	1.47	33	60	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	124	4.6	1.7	4.4	2.2	2.1	1.4
*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 primary abnormality identified is mitral valve dysplasia with suspected subaortic stenosis. The mitral valve appears abnormal and there is moderate mitral regurgitation causing mild left atrial enlargement. This is suspected to be the primary cause of the LVOT obstruction, similar to SAM in a cat, The LV hypertrophy is marked with remarkable endocardial fibrosis, which is surprising to see at such a young age. Additionally, the right ventricle appears abnormal, and

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some primary myocardial issue may be at play. This type of obstruction tends to be heart rate dependent with a dynamic profile. A small aortic leak is noted, which should be monitored going forward. No additional defects are seen; however, it should be mentioned that small defects/shunts are easily missed in congenital echocardiography. Referral should be considered due to the severity of the findings.

Lifelong heart rate control with atenolol is recommended, as the dynamic nature of the obstruction should be reduced at lower heart rates. While typically this is not instituted until the patient is 4-6 months of age, I would not hesitate to start this at this juncture given clinical signs reported at home and severity of fibrosis/hypertrophy seen here. No other medications are clearly warranted at this time. 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 in this case is poor, given the severity biventricular changes at such a young age. If quality of life suffers and referral is declined, euthanasia should be considered. This patient is at extremely high risk for sudden death, due to the appearance of the left ventricle and this will persist lifelong.

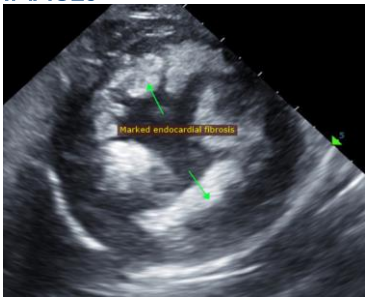
Anesthesia is not advised in this case.

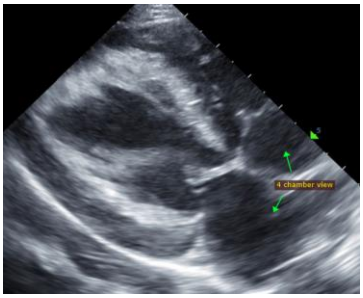
PLAN

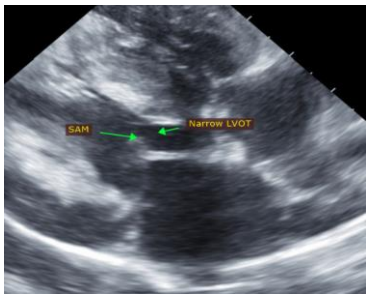
Highly recommend referral in any complex congenital case. If declined, institute titrating dose of atenolol: 25mg tablets; Give ¼ tab once daily. Recheck heart rate in 1-2 weeks with target stressed rate of <140bpm, Increase as needed until target reached. Will need to up-titrate to desired effect as puppy grows. If quality of life suffers, humane euthanasia should be considered.

Recommend recheck echocardiogram in 6 months to screen for progressive changes.

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