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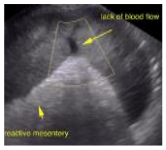
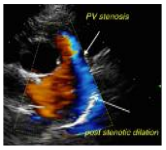
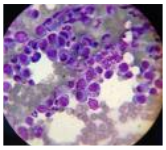
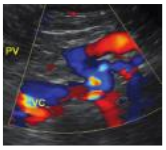

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1-800-838-4268 info@sonopath.com

PATIENT
Scout McKinney

SPECIES
Canine

BREED
Mix

SEX
Male Neutered

AGE
6 years

WEIGHT
25.6lbs

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

IMAGING PERFORMED BY
Kacie Edwards

HOSPITAL NAME
Boren Veterinary Medical Teaching Hospital – OSU

REFERRING VET
Dr. Dugat

INVOICE
30330

DATE
4/19/23

PRESENTING CLINICAL SIGNS

History: Historical PDA. Significant abdominal breathing and wheezing. Normal activity. Considering surgical closure at this time. BP: 113mmHg.
-Current medications: Vetmedin, 2.5mg: 1 tablet (2.5mg) SID, Lasix, 50mg: 1/2 tablet (25mg) BID, Enacard 5mg tablets: 1 tablet (5mg) BID.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Continuous flow detected with color Doppler in the distal pulmonary artery in the region of the ductus arteriosus. A primarily left to right shunt is visualized with a decreased max velocity of 3.9m/s. Spectral Doppler does not support a significant right to left component. The duct can be seen entering pulmonary artery (see below). Moderate MPA dilation; mild pulmonic insufficiency. Marked volume overload of the left heart with increased sphericity and severely decreased function. Marked LA dilation. Flow can be seen crossing the atrial septum from left to right, consistent with a PFO. Normal pulmonic outflow velocities. The PV appears normal. No aortic insufficiency. Normal aortic outflow velocity due to volume overload. Moderate eccentric MR decreased velocity. Mild TR. Velocity consistent with early pulmonary hypertension. Mild right heart enlargement. No effusions or 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	4.2	2.8	NM	>3.0	14	28	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	NM		1.3	11.6	5.5	7.9	6.8
*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

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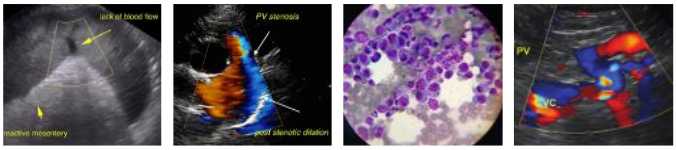

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The primary issue in this patient is in a fact a patent ductus arteriosus (PDA). This is a congenital condition where a blood vessel present in the fetus remains open after birth. When patent, this allows blood to recirculate through the lungs inappropriately and volume overloads the left heart chambers as is seen here. The left heart is markedly volume overloaded, with marked left heart dilation and significant secondary LV dysfunction consistent with myocardial failure. There is also moderate MR, likely secondary to annual stretch. Mild TR is noted with evidence of mild pulmonary hypertension, this is likely due to chronic pulmonary over-circulation. Finally, flow can be seen crossing the atrial septum, most consistent with a patent foramen ovale (PFO). This is clinically insignificant. No additional congenital defects are observed; however, it is important to note that ultrasound is not entirely sensitive for small shunts/abnormalities.

Given these findings, the patient's breathing pattern likely reflects CHF (CXR recommended) and adjustments to cardiac medications are recommended as below. If the patient is or becomes unstable, hospitalization should be considered. The shunt velocity is lower than is typical likely suggesting early shunt reversal. That being said, a significant right to left component is not visualized. Even without significant reversal seen here, **surgical closure is likely of little benefit at this time. The changes to the left heart are permanent and irreversible and medical management is the more reasonable approach.** Sildenafil may be of some benefit in this case and is suggested as below.

Long term prognosis is grave with this degree of disease. Medical management can be attempted; however, if and when quality of life suffers euthanasia should be elected. Sudden death is possible at any time.

Monitoring of sleeping respiratory rates will be paramount to screen for congestive heart failure at home. Omega fatty acid supplementation and mild salt restriction may also be of some long-term benefit. Monitor for development of a cough, labored breathing, exercise intolerance or worsening collapse episodes in the future. Patient will always be at risk for recurrence, spontaneous congestive heart failure, development of malignant arrhythmias and/or sudden death in the future.

PLAN

Consider hospitalization if indicated. Baseline ECG and CXR are highly recommended. The following oral medications are suggested: Increase Lasix to 25mg PO q8h. Increase Pimobendan to 5mg PO q8h. Discontinue Enalapril until the patient is normotensive. Institute Spironolactone 12.5mg PO q12h. Institute Sildenafil 10mg PO q12h.

Monitor renal values and BP in 1-2 weeks, then every 3-4 months while on diuretics. If quality of life suffers, euthanasia should be elected.

Recheck: Recommend conservative monitoring with a recheck echocardiogram in 6 months, sooner if any development of associated clinical signs occurs in the interim.

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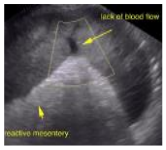
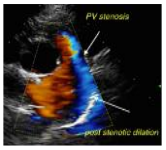
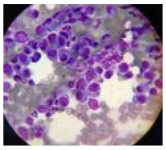
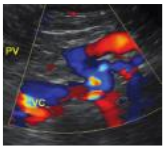

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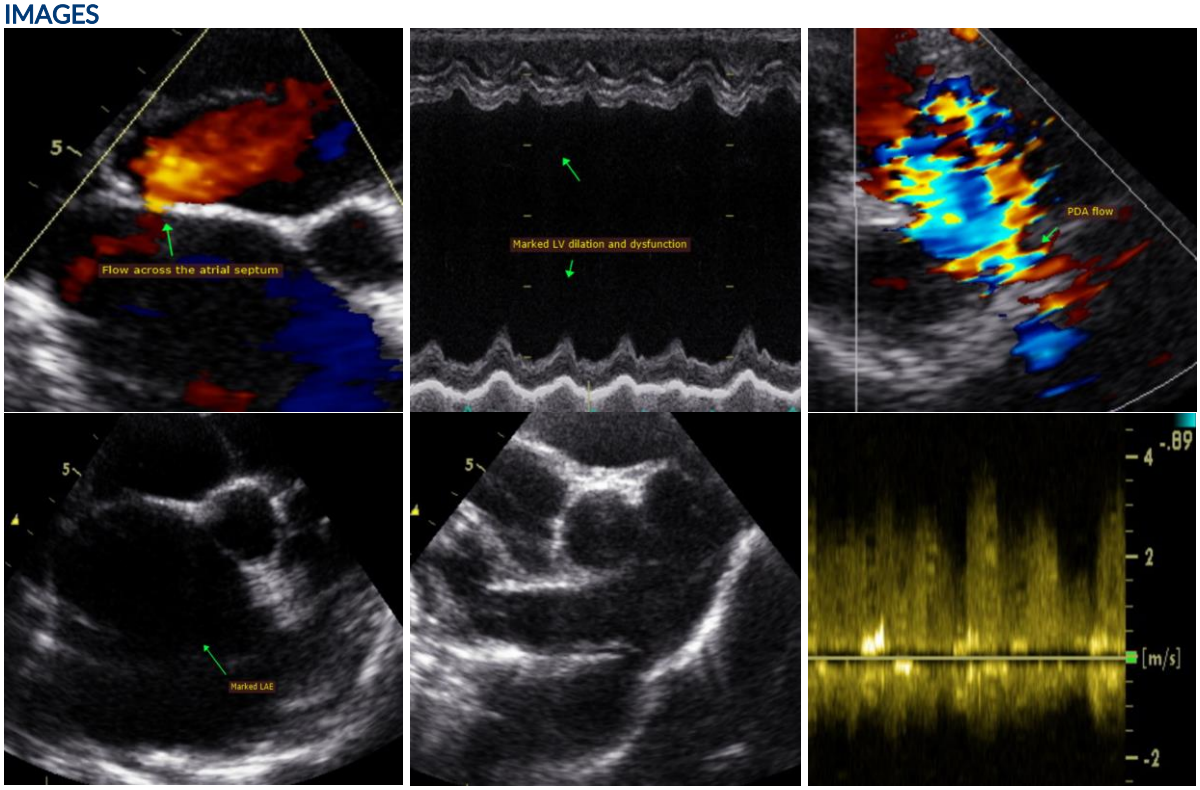
IMAGES



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. This report was generated using transcription software, and minor dictation errors may be present. 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