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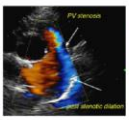
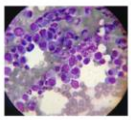
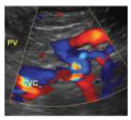

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PATIENT
Million Fettig

SPECIES
Canine

BREED
Labrador Retriever

SEX
Female Spayed

AGE
9 years

WEIGHT
98lbs

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

IMAGING PERFORMED BY
Kim Liedberg

HOSPITAL NAME
SVS Imaging WI

REFERRING VET
Dr. Baum

INVOICE
28220

DATE
1/10/23

PRESENTING CLINICAL SIGNS

History: Presented for sudden collapse during walk. Very weak and cyanotic. Abdominal radiographs have loss of detail in abdomen with gastric material. Thoracolumbar disc space narrowing. Tested positive for anaplasmosis. Normal ProBNP. No murmur. BW: WNL.
-Chest radiographs; Reveal VHS: 11.4 which suggests enlargement of cardiac size.
-Current medications: Rimadyl, Doxycycline, and Gabapentin.
AUS results: Ascites.

ECHOCARDIOGRAM FINDINGS

2D, m-mode, color flow and doppler imaging is available. Small volume pericardial effusion without obvious tamponade. No obvious lesion associated with the right heart or external surface. Trivial mitral regurgitation. No TR. LV function is mildly depressed. Left atrium is normal in diameter. LV appears normal in dimension. The right heart is normal in dimension. The pulmonic and aortic valves are normal in appearance. Normal outflow velocities; laminar flow. No pleural effusion seen.

CARDIAC CHART

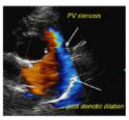
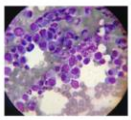
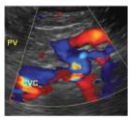
CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (Boon method)	LA/AO (Heart Base; Swe)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
PATIENT	NM	NA	1.2	1.2	24	40	0.6
CANINE CARDIAC PARAMETERS	**HR** (BPM)	**AV VMAX** (m/s)	**PV MAX** (m/s)	**BODY WEIGHT** (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	130	0.8	0.6	44.5	3.2	4.2	3.2
*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 patient's clinical issues is likely to be acute development of pericardial effusion. The cardiac structure and function are largely normal with a mildly depressed function. This is clinically insignificant comparatively. The patient is not clearly in active tamponade at this time; however, this could happen imminently. No obvious additional issues are identified.

Assuming the effusion is confirmed to be hemorrhagic, the two most common causes of hemorrhagic pericardial effusion in older dogs include idiopathic and neoplastic. Less commonly,

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pericarditis (an inflammatory condition), a left atrial tear, or a bleeding disorder should also be considered. Idiopathic by definition means that a cause cannot be found. If diagnosed (a rule out diagnosis), the long-term prognosis with idiopathic effusion has the potential to be fair. In a senior lab, cancer is the most likely diagnosis until proven otherwise, even without an obvious lesion.

Regarding neoplasia, the most common types of cardiac cancer-causing pericardial effusion include hemangiosarcoma (HSA), chemodectoma, or mesothelioma. The prognosis varies a great deal depending on the underlying type of cancer. A hemangiosarcoma is considered most likely; however, **no discrete tumors were seen today**. Extra-cardiac lesions are easily missed, and advanced imaging may be warranted such as a thoracic CT scan. **Fluid sampling is suggested (abdominal) to try to understand the sequence of events. My assumption in this case is that an acute accumulation of pericardial effusion led to tamponade and secondary ascites, and some of the effusion has since reabsorbed. An alternative explanation would be that some primary malignancy is causing both the pericardial and peritoneal effusion. This differentiation is key to determining the next step. Sampling the pericardial effusion should be attempted if the volume increases at any time in the future.**

Regardless of underlying cause, it is impossible to predict if and when pericardial effusion will increase and start to cause cardiac tamponade. Once removed, reeffusion rates are also highly unpredictable. Some patients with idiopathic effusion need to be tapped between 1 and 3 times then never again. Other patients may experience frequent recurrence with either HSA or idiopathic disease. If the effusion reoccurs frequently, a surgical procedure called a pericardiectomy can be discussed.

This patient will always be at risk for signs of recurrent pericardial effusion including pale gums, difficulty breathing, lethargy/collapse, cough, exercise intolerance, abdominal distention, vomiting, inappetence and/or sudden death. If you notice any of these symptoms, urgent evaluation should be sought.

PLAN

Baseline BP is recommended. Consider full systemic evaluation and thoracic CT scan as discussed. Recommend sampling and cytology of abdominal effusion. Consider pericardiocentesis (diagnostic), particularly if the volume increases.

No cardiac medications are clearly indicated at this time. Over the counter herbal supplement Yunnan Baiyao may help decrease risk of bleeding, however true benefit is speculative (1 capsule PO BID).

A recheck of suspicious lesion and fluid accumulation in 1-2 months, sooner if recurrence of clinical signs.

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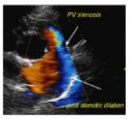
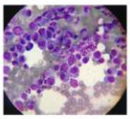
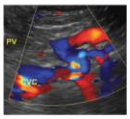

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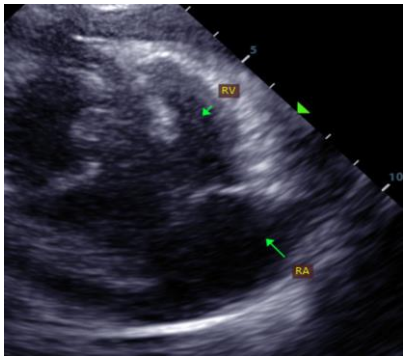

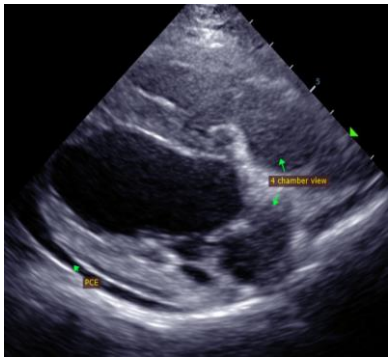

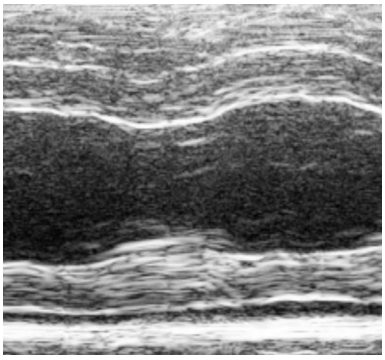

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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