


PATIENT

Suzy Matos

PRESENTING CLINICAL SIGNS

Grade IV/VI murmur PMI right, crackles bilaterally. Trouble breathing, lethargic, weak today. SP02 93%. Rads: Cardiomegaly, interstitial pattern, hepatomegaly. Current meds: Lasix 3mg/kg IM, O2.

SPECIES

Canine

ULTRASONOGRAPHIC EXAMINATION OF THE HEART
BREED

Cavalier King Charles Spaniel

SEX

Spayed Female

AGE

13 Years

WEIGHT

20.6 Pounds

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	5.02		1.4	1.45	46	79	0.1
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				
PATIENT	117	0.8			2.47	2.35	

Cardiac Presentation

The cardiac presentation in this patient presented right-sided volume overload with mitral and tricuspid insufficiency. The right atrium was twice the size of the left atrium. Severe tricuspid insufficiency and pulmonary hypertension present with volume overload of the right atrium and right ventricle and pulmonary artery. The left atrium and left ventricle were of normal size with adequate contractility. However, mitral insufficiency was present. Vegetative changes noted on the mitral and tricuspid valves. Pericardium and pleural spaces were unremarkable. Mild filling of the left atrium noted, however compensated. Minor aortic insufficiency noted. The vena cava was dilated at 1.0 cm. Tricuspid insufficiency was severe at 4.0 m/sec. Pulmonic insufficiency noted at 3.2 m/sec.

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Shari Reffi, CVT

HOSPITAL NAME

Newton Vet Hospital

ULTRASONOGRAPHIC FINDINGS

- Right-sided heart failure
- Pulmonary hypertension

REFERRING VET

Dr. Chun

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Concern for primary respiratory disease with secondary pulmonary hypertension along with concurrent valvular disease. Recommend Pimobendan 0.3 mg/kg BID, Spironolactone at 1.2 mg/kg BID, bronchodilator, and broad-spectrum antibiotics. Sildenafil could also be considered at 1 mg/kg BID. However, this patient is at risk for sudden death. Acute pneumonitis, pulmonary thromboembolic disease or other thoracic disease suspected. The right-sided enlargement and failure is not secondary to left-sided failure. It is a right-sided failure likely owing to primary respiratory disease and increased pulmonary pressures along with concurrent valvular disease. Very guarded prognosis. Recheck echo in 10 days if the patient is able to be stabilized.

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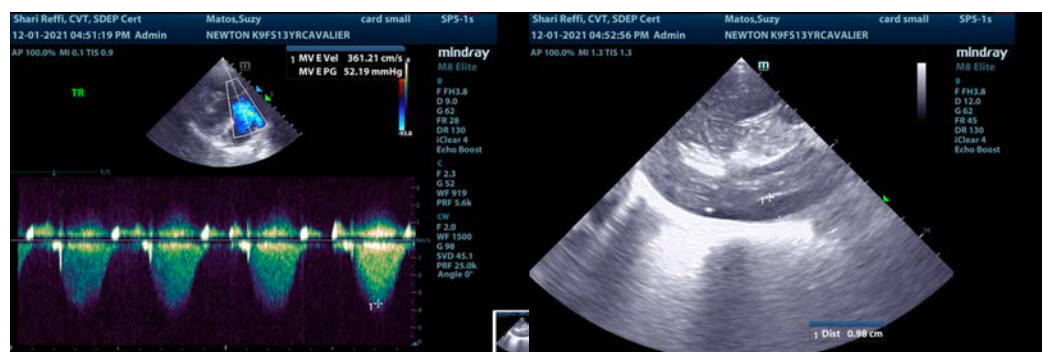
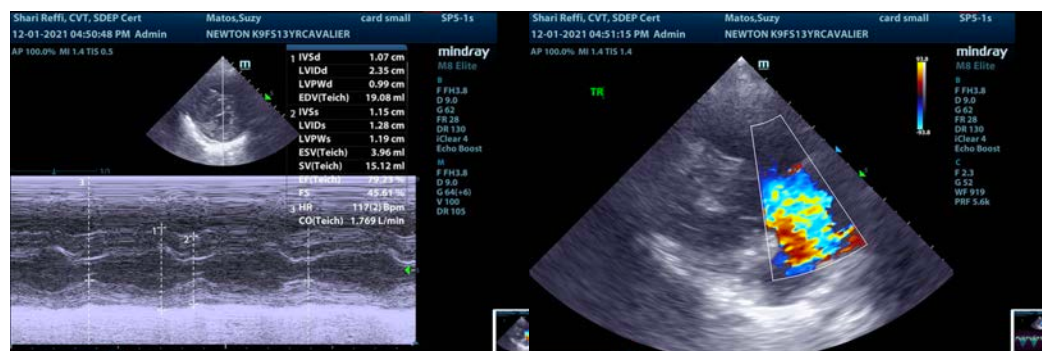
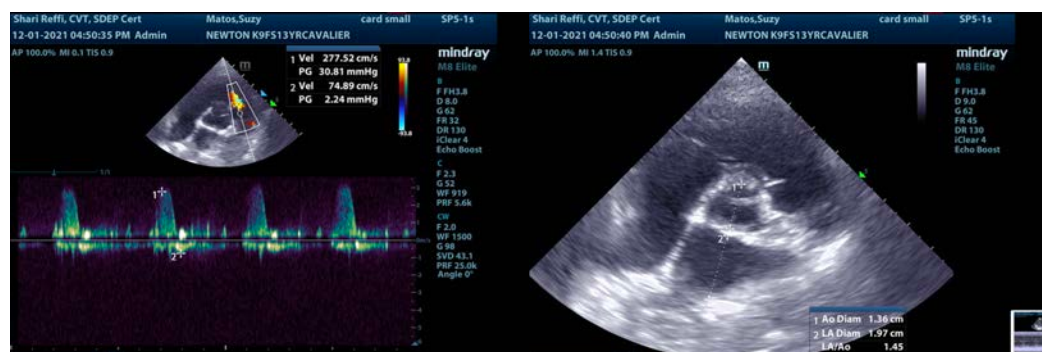
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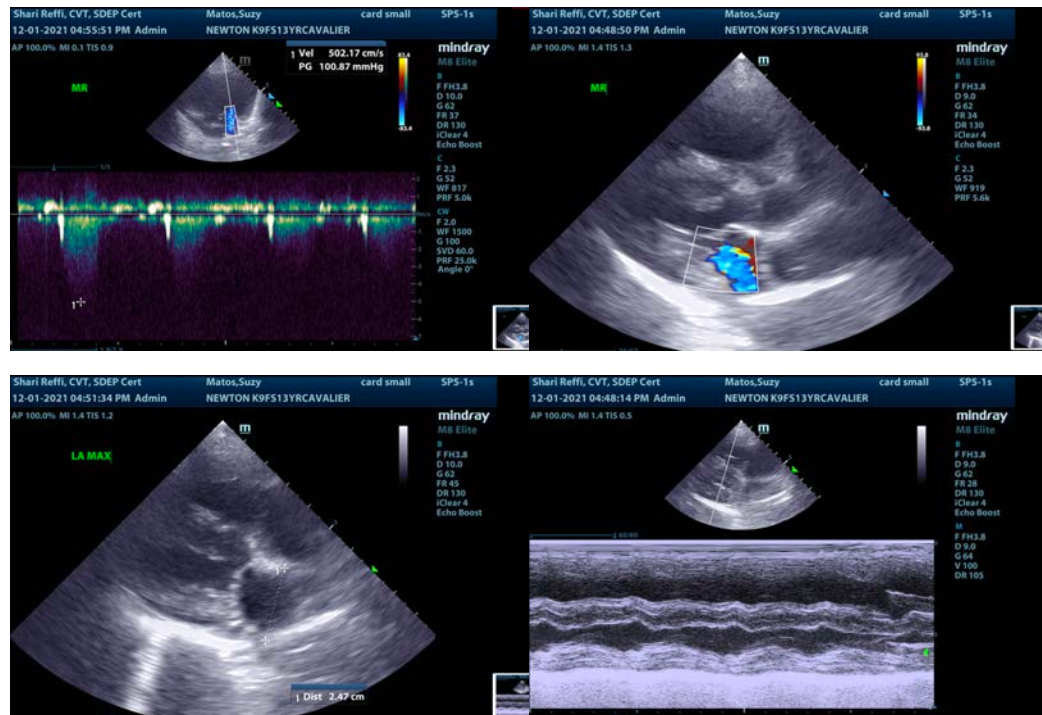
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The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Eric Lindquist, DMV, DABVP, Cert. IVUSS, CEO of SonoPath.com
info@SonoPath.com

Right Heart Disease-General Considerations

<http://www.sonopath.com/RightHeartDisease>

Description: Right heart disease is often an incidental finding, which can be either cardiogenic or secondary to respiratory or systemic disease. The coughing patient with right heart disease may present with primary respiratory disease (i.e., bronchial collapse, collapsing trachea, pneumonitis) and suffer from secondary pulmonary hypertension (PHT). Concurrent mitral valve disease and chronic left-sided congestive heart failure (CHF) might also lead to PHT. The dyspeic patient with right heart enlargement might have pulmonary hypertension due to airway disease, chronic CHF, parenchymal lung disease (e.g. pulmonic fibrosis), or a cardiac shunt with secondary PHT and shunt reversal.



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Primary cardiac causes of right heart enlargement include: tricuspid dysplasia/degeneration; pulmonic stenosis; pulmonic insufficiency; atrial or septal defects; patent ductus arteriosus; right auricular masses; and pericardial peritoneal diaphragmatic hernias. The second most common cause of right-sided enlargement is secondary PHT, which results in high-velocity tricuspid insufficiency (TR vel.>2.8 m/sec) and pulmonic insufficiency due to diseases that cause increased pulmonary vascular resistance or increased pulmonary wedge pressures. The most common cause of secondary PHT is left-sided heart failure (LHF), which presents radiographically as a more globoid-shaped heart with marked left atrial and ventricular enlargement. There are also signs of left-sided CHF as opposed to a simple prominent cranial waist or reverse D radiographic presentation.

Secondary, non-cardiac causes of PHT include: acute or chronic respiratory disease; pulmonary thromboembolic disease; thoracic neoplasia; excessive thoracic fat deposition (e.g. Pickwickian syndrome, which leads to chronic hypoxia); brachycephalic syndrome; high altitude disease; heartworm disease; and primary vascular disease.

Clinical Signs: The most common presenting symptoms of right heart disease are collapse, syncope, intermittent or constant acute respiratory distress (e.g. thromboembolic disease), and exercise intolerance.

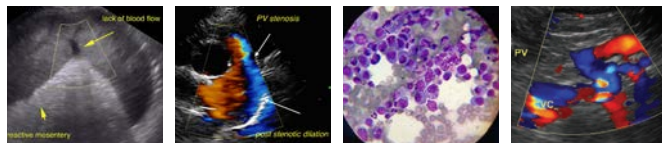
Diagnostics: Physical examination may reveal a right-sided apical heart murmur and/or a cranial left heart murmur, a split S2, jugular distension, ascites, and signs consistent with respiratory disease (i.e., cough, wheeze, tracheal collapse, tachypnea). Radiographic findings may reveal an enlarged right atrium, right ventricle, and/or primary/secondary branches of the pulmonary artery. In cases of PHT, an enlarged or engorged pulmonary artery is often present. Tortuous arteries or those that suddenly terminate can indicate the presence of thromboembolic disease or heartworms. An interstitial pattern might indicate the presence of pulmonary parasitism or primary interstitial lung disease. Pulmonic stenosis is suspected if the pulmonic segment is enlarged. ECG findings include tall P and S waves with a right axis shift.

Treatment: Please refer to the chapter “Pulmonary Hypertension” for therapeutic recommendations.

References:

Oyama MA, Rush JE, Rozanski EA, et al. Assessment of serum N-terminal pro-B-type natriuretic peptide concentration for differentiation of congestive heart failure from primary respiratory tract disease as the cause of respiratory signs in dogs. *J Am Vet Med Assoc* 2009;235:1319-25.

Rozanski E. Interstitial lung disease in small animals. Proceedings from American College of Veterinary Internal Medicine Forum, Denver, CO, June 15-18, 2011.



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Zoia A, Augusto M, Drigo M, Caldin M. Evaluation of hemostatic and fibrinolytic markers in dogs with ascites attributable to right-sided congestive heart failure. *J Am Vet Med Assoc* 2012;241:1336-43.

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