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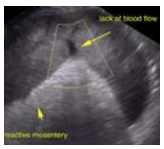
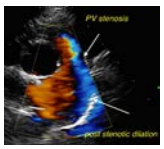
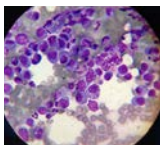
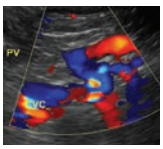

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1-800-838-4268 info@sonopath.com

PATIENT
Yogi Cannon

SPECIES
Canine

BREED
Yorkie

SEX
Neutered Male

AGE
15 Years

WEIGHT
8.1 Pounds

INTERPRETED BY
Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY
Kelly Vazquez

HOSPITAL NAME
New Bridge VP

REFERRING VET
Dr. Abina Glennon

INVOICE
42034

DATE
10/12/22

PRESENTING CLINICAL SIGNS

History of collapse (not seizures). No current meds. Bloods pending. R/O pulmonary hypertension

ULTRASONOGRAPHIC EXAMINATION OF THE HEART

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			1.15	1.3			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		1.17	0.7		1.61		

Cardiac Presentation

The cardiac presentation revealed normal volumes in the left atrium and left ventricle. Severe eccentric hypertrophy of the right ventricle noted, and right atrial enlargement. Severe tricuspid insufficiency noted at 5.3 m/sec with pulmonary hypertension. Minor mitral insufficiency present, not clinically significant. Left-sided contractility appeared to be adequate. Pulmonic insufficiency noted at 3.5 m/sec. Hepatic veins were dilated, as was the vena cava, consistent with emerging right-sided heart failure. No pericardial or pleural effusion noted.

ULTRASONOGRAPHIC FINDINGS

- Tricuspid insufficiency and pulmonary hypertension
- Right-sided cardiac enlargement and emerging right-sided heart failure with dilated hepatic veins
- Minor mitral insufficiency, not clinically significant
- Pulmonic insufficiency

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The right cardiac pathology would justify collapse in this patient. Recommend initiating Sildenafil at 1.0 mg/kg BID, ACE inhibitor 0.5 mg/kg SID, and increasing the Sildenafil to 1.5 mg/kg BID after two weeks, monitoring blood pressure, BUN, Creatinine, and the clinical status weekly. However, cardiology referral would be ideal for management. Assessment for primary pulmonary disease as a predisposing issue or even heartworm should be considered, even though no evidence of heartworm noted on the echocardiogram.

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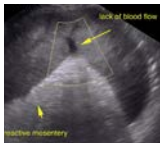
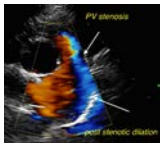
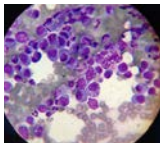
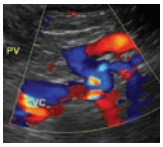

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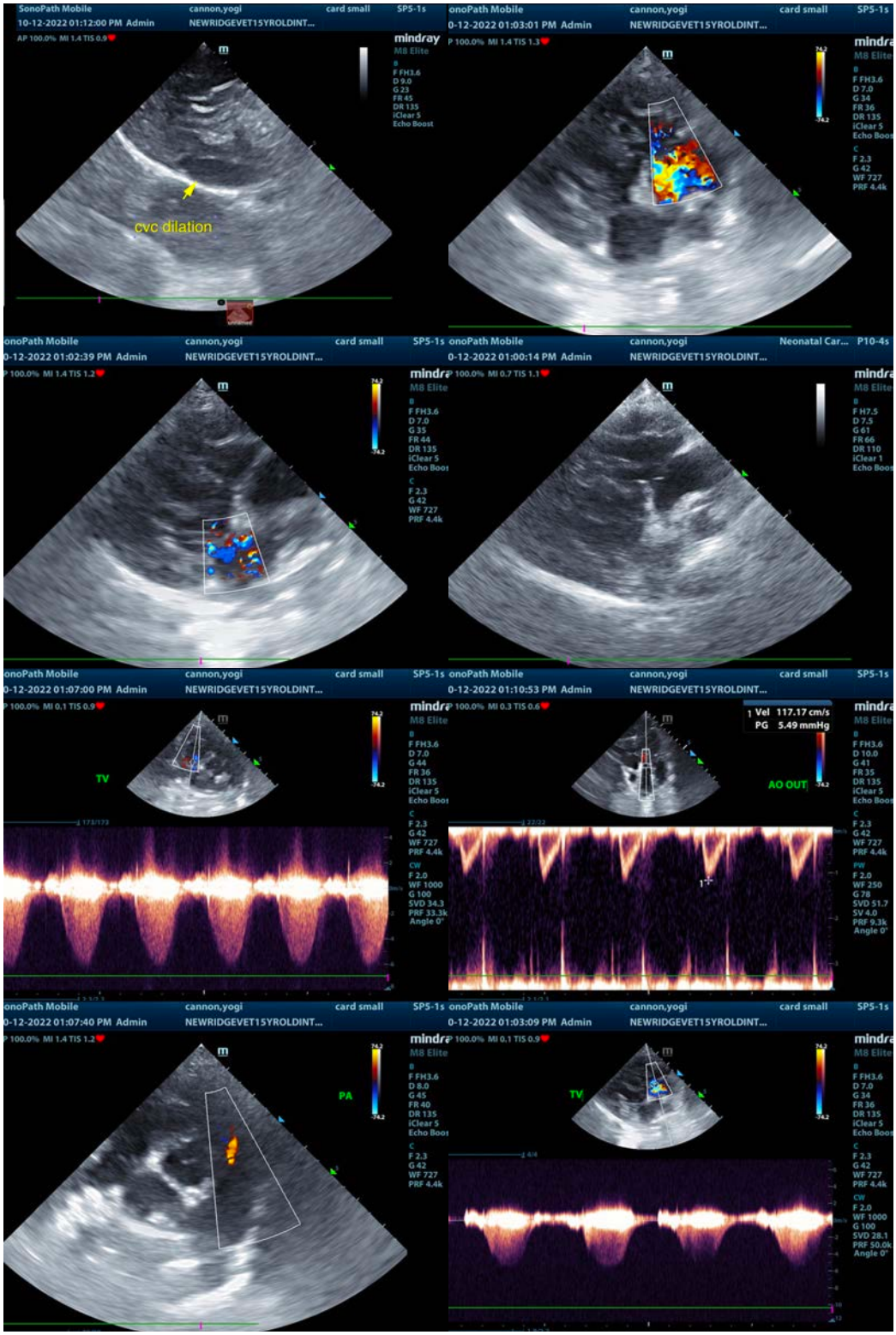

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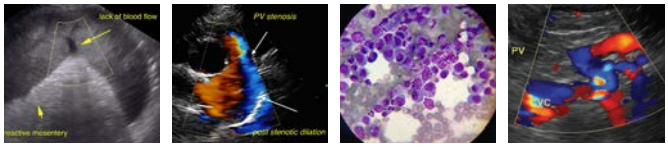

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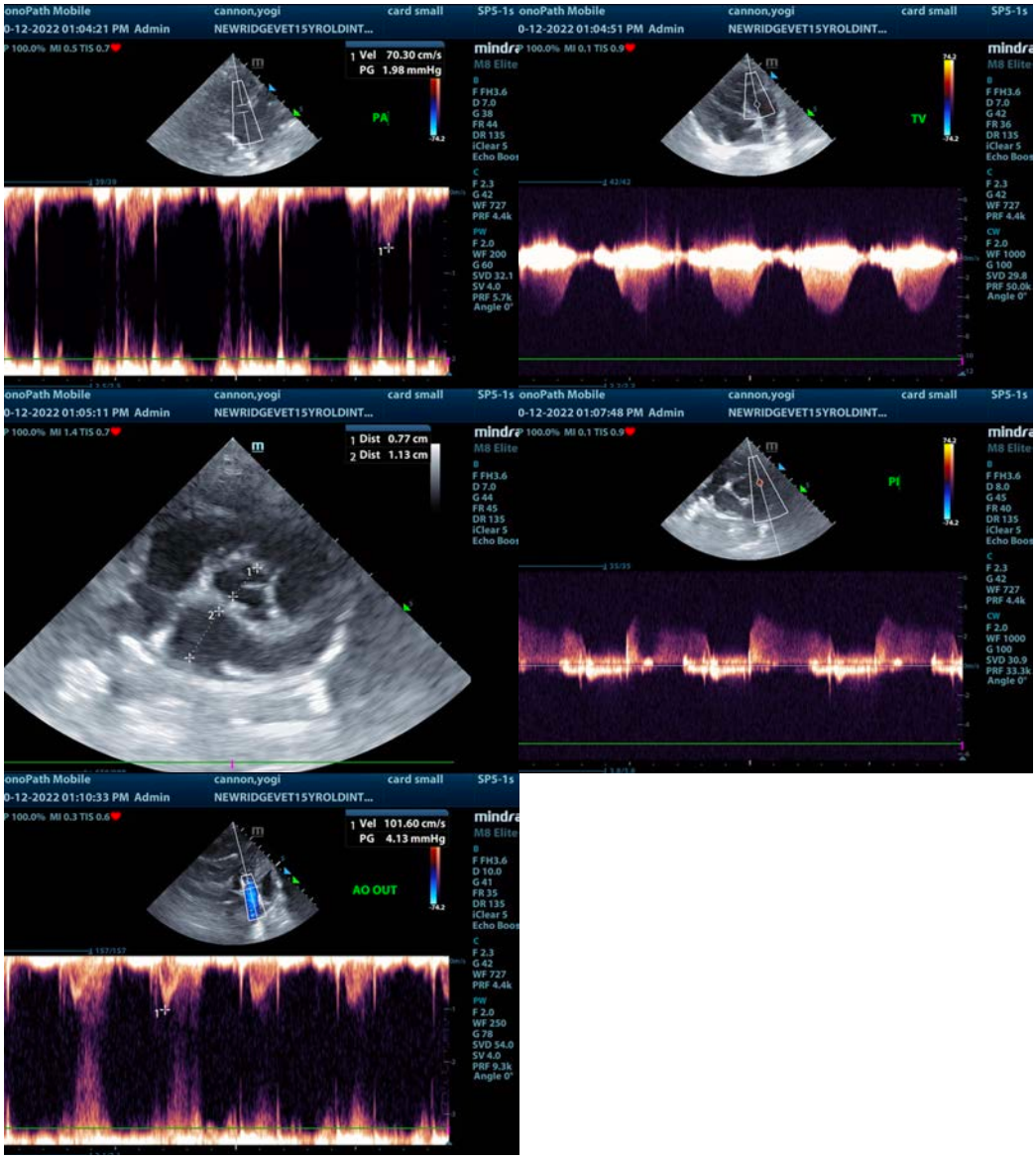

The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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

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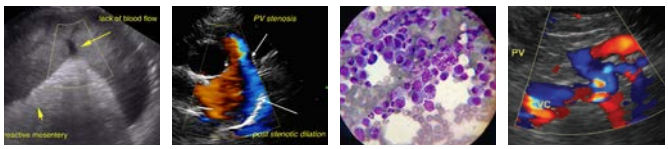

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Right Heart Disease-General Considerations

http://www.sonopath.com/RightHeartDisease

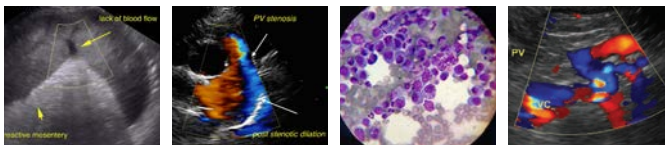
Description: Right heart disease is often an incidental finding, which can be either cardiogenic or secondary to respiratory or systemic disease. The coughing patient with right heart disease may present with primary respiratory disease (i.e., bronchial collapse, collapsing trachea, pneumonitis) and 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.

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.



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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.

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.