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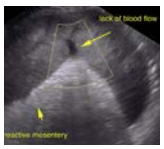
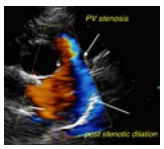
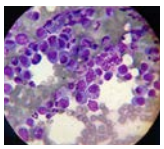
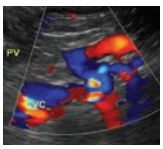

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1-800-838-4268 info@sonopath.com

PATIENT
Mika Vahorchak

SPECIES
Canine

BREED
German Shepherd

SEX
Spayed Female

AGE
7 Years

WEIGHT
82 Pounds

INTERPRETED BY
Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY
Shari Reffi, CVT

HOSPITAL NAME
Newton Vet Hospital

REFERRING VET
Dr. Barron

INVOICE
38359

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6/3/22

PRESENTING CLINICAL SIGNS

Hematochezia, hx of anorexia. Current meds: Metronidazole (h/o Atopica, Ketoconazole, Prednisone)
Abnormal PE/Chem/CBC/UA Results: Neut 14.73, Glu 167, ALP 309

ULTRASONOGRAPHIC EXAMINATION OF THE HEART & ABDOMEN

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			1.0	1.08	30		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		1.07	1.08		3.5	4.5	

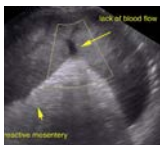
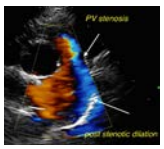
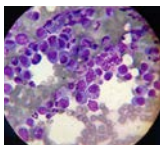
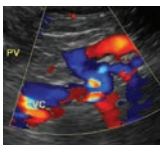
Cardiac Presentation

The echocardiogram in this patient demonstrated normal **left atrial** size based on 3 separate methods of LA evaluation. The cranial and caudal **mitral** valve leaflets presented normal linear structure, extension in systole, and union in diastole with normal kinesis. The **left ventricle** presented thicknesses with linear contour and was not dilated nor restricted. The **myocardium** presented normal echogenicity without subjective evidence of significant fibrotic or ischemic disease. **Contractility** of the ventricular walls was adequate and in normal range for this patient evidenced by the fractional shortening measurement and subjective evaluation of the different regions of the myocardium. The **left ventricular outflow** tract demonstrated normal laminar flow and subjective structural integrity. The **right atrium** and auricle were visualized, no obvious masses. However, a neoplastic event could not be completely ruled out. **Tricuspid** valvular assessment demonstrated adequate linear morphology and kinesis. The **right ventricle** was of normal size (1/3 diameter of LV), chordae structure, myocardial echogenicity and thickness. **Pulmonic** insufficiency noted at 2.11. Pleural effusion noted in the extracardiac space. A minor amount of pericardial effusion noted without tamponade effect. A small density was noted in the pericardial space, adjacent to the right auricle. This may be a clot or potential neoplastic event.

Urinary System

The **urinary bladder**, trigone, and pelvic urethra presented normal thicknesses and normal tone. The ureters were not visible which is normal. No uroliths or sediment were visualized and anechoic urine was present. No evidence of inflammatory or neoplastic changes were noted. Ureteral papillae were normal.

The **kidneys** revealed normal size and structure, corticomedullary definition and ratio for this age. The cortices presented largely uniform texture with normal echogenic relationship to liver and spleen. Medullary structure differed distinctly from the cortex and no evidence of pelvic dilation was present.

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The capsules were acceptably uniform without significant irregularities. The left kidney measured 8.08 cm.

Adrenal Glands

Both **adrenal glands** were visualized and recognized as having normal shape, size, position and echogenicity for this breed. The phrenic vasculature, glandular echogenicity and detail were unremarkable. Capsule, cortex, and medullary definition were normal for this age patient. The left adrenal gland measured 2.2 cm x 0.40 cm at the cranial pole and 0.36 cm at the caudal pole. The right adrenal gland measured 1.56 cm x 0.35 cm at the cranial pole and 0.31 cm at the caudal pole.

Spleen

The **spleen** revealed a hypoechoic nodule, mildly disruptive at 1.26 cm. The remainder of the spleen was unremarkable.

Liver

The **liver** images submitted revealed subjectively normal liver size, contour, and structure. Parenchymal echogenicity was naturally coarse and hypoechoic to the spleen. Vascular and biliary tracts were of normal volume with no evidence of congestion. The gallbladder presented acceptably thin walls with primarily anechoic content. The cystic and common bile ducts were normal. No pathological hepatic lymphadenopathy was evident. No overt structural evidence of inflammatory, infiltrative or regenerative pathology was evident.

Transdiaphragmatic view demonstrated pleural effusion.

Gastrointestinal

A minor amount of non-shadowing, non-obstructive ingesta was noted in the **stomach**. Transit of chyme into the small intestine was normal. Curvilinear patterns were maintained throughout the GI tract. No evidence of pathology. Small and large intestine demonstrated normal luminal chyme and stool consistency respectively. No obstructive or overt infiltrative disease was noted. No associated abnormal lymphatic activity was noted.

Pancreas

The base and limbs of the **pancreas** were observed to be largely isoechoic to surrounding omental fat. Pancreatic duct and capsular contour were acceptably normal and parenchyma respected normal curvilinear patterns. No overt evidence of active inflammatory or neoplastic disease was noted.

ULTRASONOGRAPHIC FINDINGS

- Non-cardiogenic pleural effusion
- Trace pericardial effusion with clot or possible early mass
- Focal splenic nodule – hyperplasia, round cell neoplasia or less likely hemangiosarcoma

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Recommend chest CT in this patient to assess for a neoplastic event outside of the acoustic windows that were available. The abdomen was largely unremarkable other than the splenic nodule. Guarded prognosis. An underlying neoplastic event in the thorax +/- spleen versus pleuritis or less likely pericarditis.

SonoPath CT Services are offered at the Blairstown Animal Hospital. Blairstown animal hospital is just a 30-minute drive west on route 80 from the route 80/287 interchange/Parsippany, New Jersey. More information can be found at:

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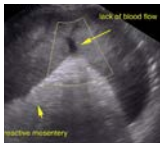
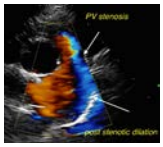
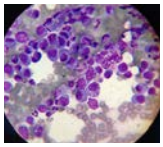
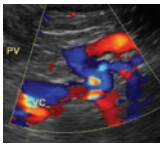

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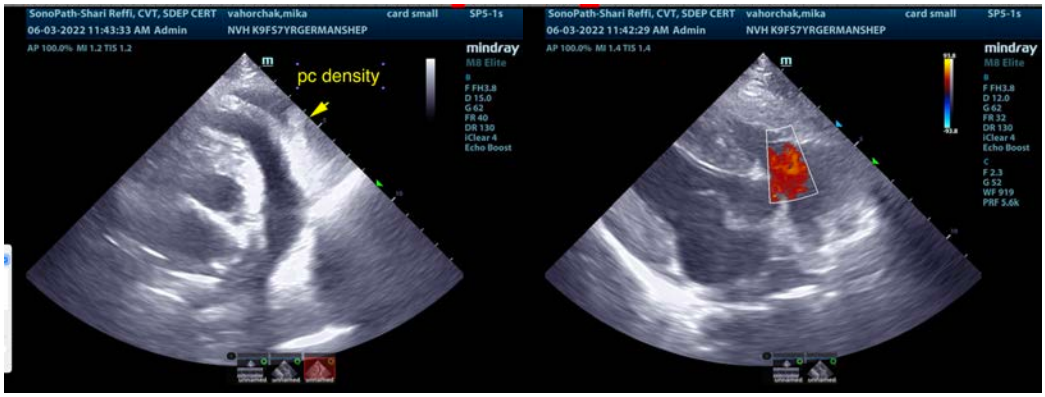
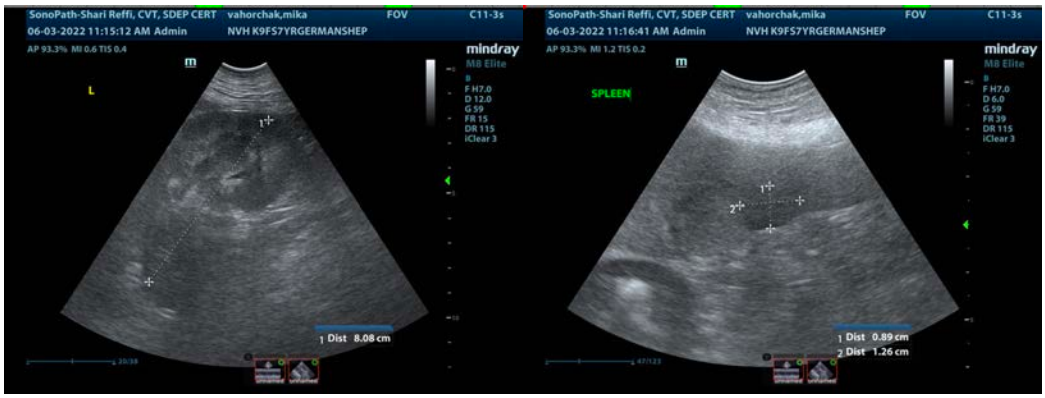
https://sonopath.com/resources/sonopaths-teleconsultation-services-and-sdep-certification/sonopath-ct-services





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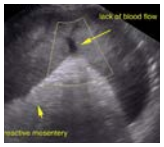
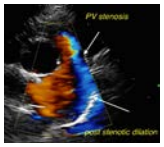
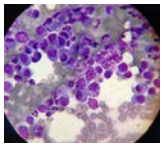
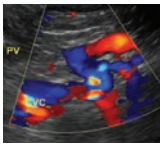

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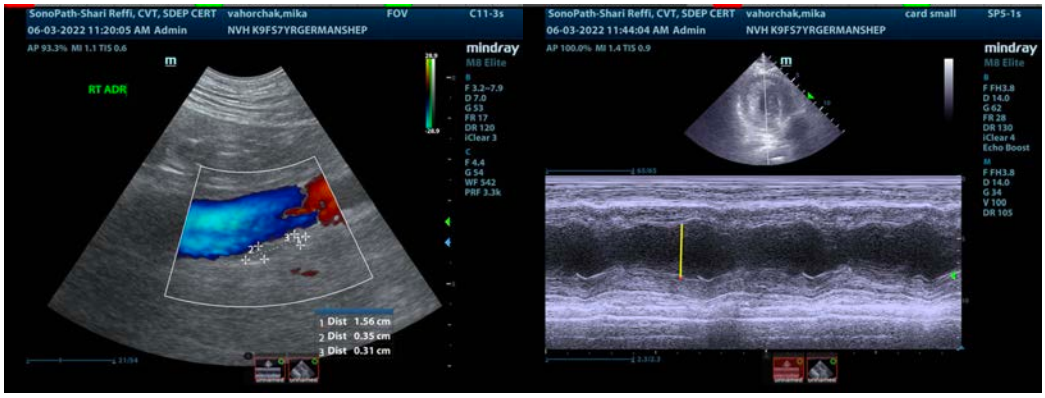

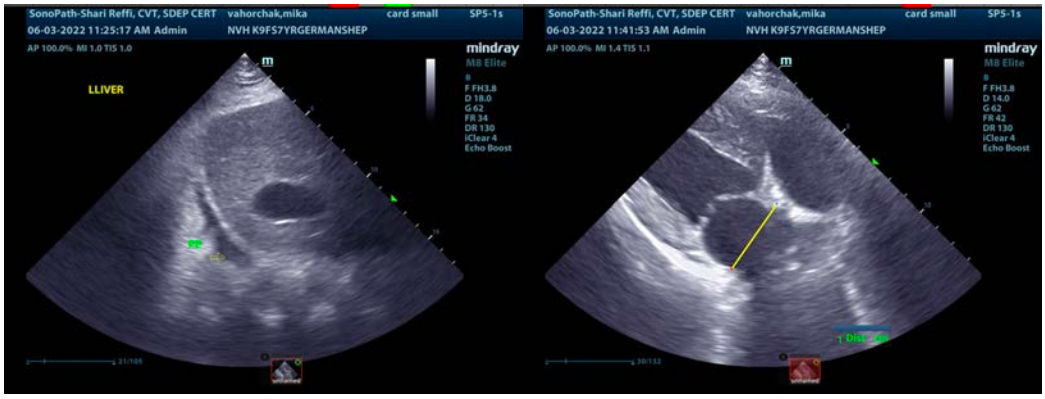

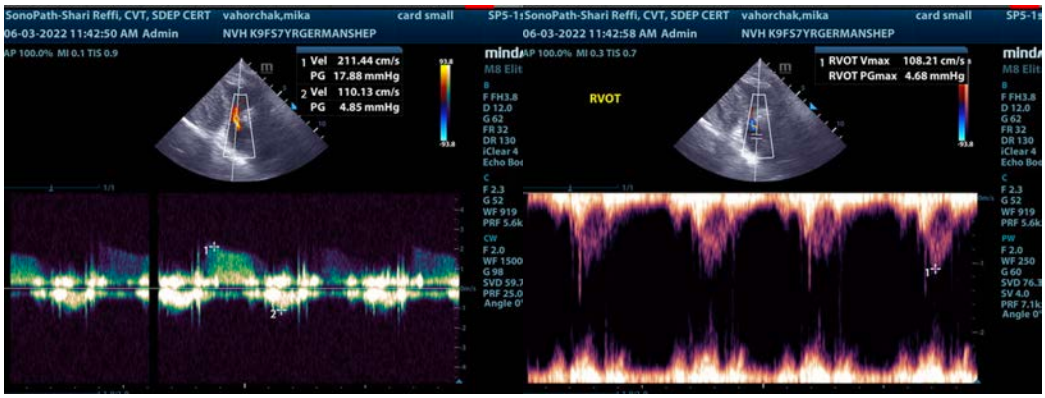

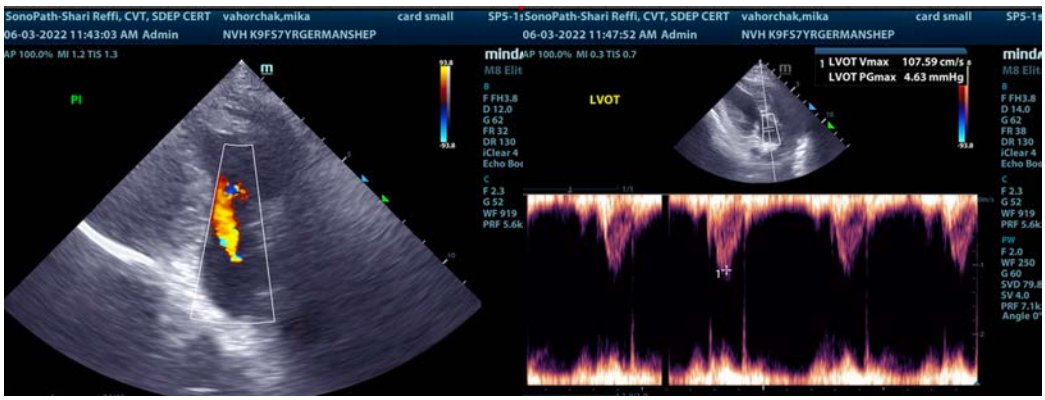

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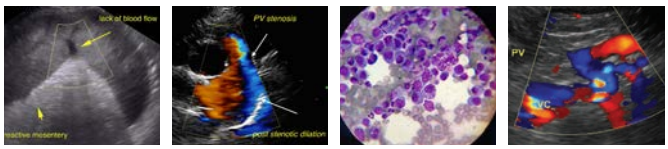

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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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

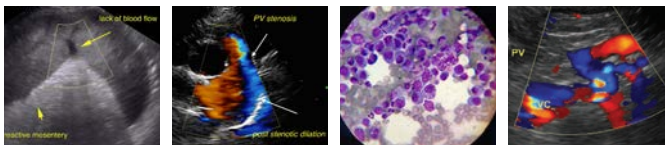
info@SonoPath.com

Pericardial Effusion and Cardiac Neoplasia

http://www.sonopath.com/CardiacNeoplasiaEffusion

Description: The pericardium is a fibrous sac that encloses the heart and the great vessels—aorta, pulmonary artery, proximal pulmonary veins, and vena cava—located at the heart's base. It is attached caudally to the diaphragm and under normal circumstances contains 1-15 mL of fluid. The latter is comprised of phospholipids that lubricate the heart and allow it to expand and contract without generating friction. The pericardium also fixes the heart, prevents excess motion, and links the diastolic distensibility of the ventricles, thus limiting the degree to which either the left or the right ventricle will distend during diastole. When there are acute changes in venous return (i.e., during exercise), the pericardium plays a critical role in limiting ventricular filling. In cases of chronic cardiac enlargement, the pericardium also becomes distended, and its ability to limit ventricular filling, especially when the heart is at rest, becomes compromised. Pericardial tamponade occurs when there is a rapid accumulation of fluid and the pressure inside the pericardium increases significantly. With tamponade, ventricular filling is restricted and cardiac output is decreased. The right atrium and ventricle are the most vulnerable to this condition as these compartments have thinner walls and a lower pressure.

Etiology: Causes of pericardial effusion include:



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- Neoplasia
  - Right atrial (RA) hemangiosarcoma
  - Heart base (aortic body) tumors
  - Mesothelioma
  - Rhabdomyosarcoma
  - Ectopic thyroid carcinoma
  - Metastatic neoplasia
- Idiopathic
- Congestive heart failure
- Peritoneal-pericardial diaphragmatic hernia
- Pericardial cyst
- Hypoalbuminemia
- Infectious pericarditis (bacterial, *Coccidioides immitus*)
- Feline infectious peritonitis
- Left atrial tear secondary to valvular disease
- Coagulopathy

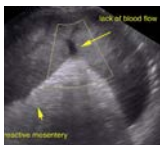
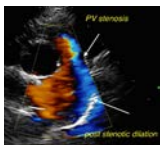
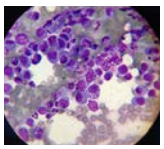
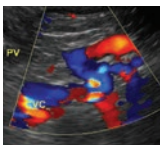
The majority of neoplastic masses consist of hemangiosarcoma and heart-based tumors (chemodectomas or ectopic thyroid adenocarcinoma). Idiopathic pericardial effusion is a diagnosis of exclusion; the effusion is typically hemorrhagic. Approximately 50% of dogs will be cured with a single pericardiocentesis, while some dogs will require multiple pericardiocenteses as well as surgery. A peritoneal-pericardial diaphragmatic hernia is a congenital hernia seen in dogs and cats in which the abdominal contents (i.e., liver, small intestine, spleen, stomach) herniate into the pericardial sac. Constrictive pericarditis is an uncommon condition in which a non-distensible, thickened, fibrotic pericardium develops over time.

Clinical Signs: One will observe the following clinical signs, which often present in combination: ascites, lethargy, exercise intolerance, pale mucous membranes, weak pulses, *pulsus paradoxus*, and respiratory distress.

Diagnostics: Survey radiographs will reveal hepatomegaly, cardiomegaly (generalized or sectorial globoid), and small pulmonary vessels. Pulmonary edema is typically not found, although one may discover concurrent pulmonary metastatic disease. An ECG will show electrical alternans or small complexes, but often the changes are very subtle and difficult to detect.

Echocardiography is usually considered the gold standard for diagnosing pericardial effusion. Findings include:

- Anechoic space between the heart and the pericardium.
- Abnormal side-to-side cardiac motion.
- Decreased chamber size (right ventricle [RV] and left ventricle [LV]).

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- Presence of a pericardial or cardiac mass.
- Tamponade with early diastolic RA and RV collapse.

Cytology is helpful in the diagnosis of lymphoma, septic pericarditis, and idiopathic effusion, but not in cases of neoplasia.

According to a study that found troponin I levels to be higher in dogs with neoplastic pericardial effusion, the cardiac troponin I assay can be helpful in the diagnosis hemangiosarcoma.

Prognosis:

- Cardiac hemangiosarcoma: < 8 months with surgical debulking and chemotherapy.
- Chemodectoma (aortic derived): MST 730 days post pericardectomy.
- Idiopathic: 50% complete resolution post cardiocentesis; curative with pericardectomy, which can be done via thoracotomy, or thorascopy, or using a balloon to tear the pericardium.
- Mesothelioma: Poor.
- Restrictive pericarditis: Poor, especially when the pericardium has not been surgical stripped.

References:

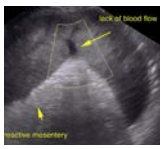
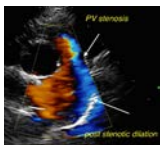
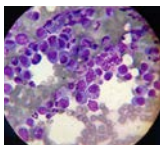
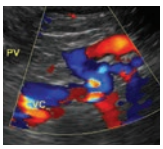
Cagle LA, Epstein SE, Owens SD, et al. Diagnostic yield of cytology analysis of pericardial effusion in dogs. *J Vet Int Med* 2014;28:66-71.

Feigenbaum H. Pericardial disease. In: Feigenbaum H, ed. *Echocardiography, 5th ed.* Philadelphia, PA: Lippincott, Williams & Wilkins; 1994:556-588.

Jackson J, Richter KP, Launer DP. Thorascopic partial pericardectomy in 13 dogs. *J Vet Int Med* 1999;13:529-33.

Johnson MS, Martin M, Binns S. A retrospective study of clinical findings, treatment and outcome in 143 dogs with pericardial effusion. *J Small Anim Prac* 2004;45:546-52.

Kienle RD, Thomas WP. Echocardiography. In: Nyland TG and Mattoon JS, eds. *Small Animal Diagnostic Ultrasound, 2nd ed*. Philadelphia, PA: WB Saunders; 2000:354-423.

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PATIENT

Mika Vahorchak

SPECIES

Canine

BREED

German Shepherd

SEX

Spayed Female

AGE

7 Years

WEIGHT

82 Pounds

INTERPRETED BY

Eric Lindquist, DMV

DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Shari Reffi, CVT

HOSPITAL NAME

Newton Vet Hospital

REFERRING VET

Dr. Barron

INVOICE

38359

DATE

6/3/22

Miller MW, Sisson DD. Pericardial disorders. In: Ettinger SJ and Feldman EC, eds. *Textbook of Veterinary Internal Medicine, 5th ed.* Philadelphia, PA: WB Saunders; 2000:923-36.

Rajagopalan V, Jesty SA, Craig LE, et al. Comparison of presumptive echocardiographic and definitive diagnoses of cardiac tumors in dogs. *J Vet Int Med* 2013;27:1092-96.

Shaw SP, Rozanski EA, Ruhs JE. Cardiac troponins I and T in dogs with pericardial effusion. *J Vet Int Med* 2004;18:322-24.

Sidley JA, Atkins CE, Keene BW, et al. Percutaneous balloon pericardiotomy as a treatment for recurrent pericardial effusion in 6 dogs. *J Vet Intern Med* 2002;16:541.

Sisson D, Thomas WP. Pericardial disease and cardiac tumors. In: Fox PR, Sisson D, Moïse NS, eds. *Textbook of Canine and Feline Cardiology, 2nd ed*. Philadelphia, PA: WB Saunders; 1999:679-701.

Sisson D, Thomas WP, Reed J, et al. Intrapericardial cysts in the dog. *J Vet Int Med* 1993;7:364-69.