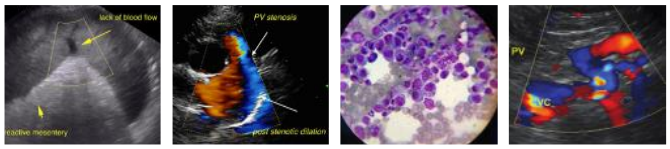
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

Dr. Taylor McConnell

INVOICE

14996

DATE

5/2/22

PRESENTING CLINICAL SIGNS

History: Collapsed at the park on 4/30/22. Patient has enlarged cardiac silhouette on RL/VD radiographs and 2/6 heart murmur. Palpable fluid wave- appeared clear, possible transudate fluid analysis pending. Current meds: Lasix 50 mgs 1 SID x 3 days oral, Gabaentin 100 mgs 1 PO BID-TID for pain. Blood work declined.

ULTRASONOGRAPHIC EXAMINATION OF THE HEART & ABDOMEN

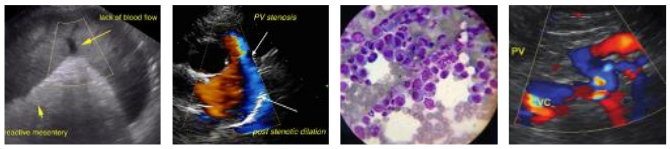
CANINE CARDIAC PARAMETERS	**MR VMAX** (m/s)	**TR VMAX** (m/s)	**LA/AO** (Boon method)	**LA/AO** (Heart Base; Swe)	**FS** (%)	**EF** (%)	**EPSS** (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.3	28-40	40-100	<0.6
PATIENT	--	--	NM	--	20	43	NM
CANINE CARDIAC PARAMETERS	**HR** (BPM)	**AV VMAX** (m/s)	**PV MAX** (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				
PATIENT	--	1.48	.83	--	--	3.43	--

Cardiac Presentation

The echocardiogram in this patient demonstrated normal **left atrial** size based on 3 separate methods of LA evaluation. Trivial **mitral** insufficiency noted, not clinically significant. 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. **Tricuspid** valvular assessment demonstrated adequate linear morphology and kinesis. **Pulmonary outflow** tract assessment revealed normal valve structure, laminar flow, and diameter (approx.1:1 pa/ao ratio). The right auricle revealed a mixed hypoechoic 3.8 cm mass, invading the right auricular free wall and right ventricular free wall. Pericardial effusion was noted with tamponade effect.

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.



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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

Dr. Taylor McConnell

INVOICE

14996

DATE

5/2/22

The **kidneys** revealed largely normal size and structure, corticomedullary definition and ratio (cortex 1/3 of medulla) were essentially maintained with some mild age-related loss of curvilinear patterns regarding the capsule and C/M junction. The cortices presented largely uniform texture with some increased echogenicity expected for his age patient. Medullary structure differed distinctly from that of the cortex and no evidence of pelvic dilation was present. The right kidney measured 4.26 cm. The left kidney measured 6.52 cm.

Adrenal Glands

The **right adrenal gland** was 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 right adrenal gland measured 2.38 cm x 1.63 cm at the cranial pole and 0.86 cm at the caudal pole.

The **left adrenal gland** was mildly enlarged, uniform, measuring 2.83 cm x 1.1 cm at the caudal pole and 1.1 cm at the cranial pole.

Spleen

The **spleen** revealed a hypoechoic nodule, measuring 0.76 cm in the mid body with mild disruption of architecture. A separate splenic nodule was present, measuring 1.62 cm with mixed echogenic changes.

Liver

Passive congestion pattern was noted in the **liver** without evident ascites. Gallbladder edema was noted.

Gastrointestinal

Examination of the **gastrointestinal tract** revealed a stomach and intestine free of stasis, of normal wall thickness, acceptable curvilinear mural detail, and peristaltic activity. 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.

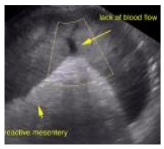
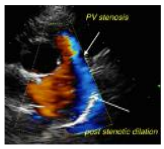
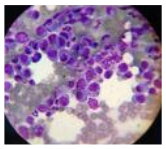
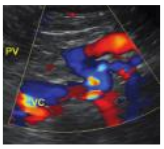
ULTRASONOGRAPHIC FINDINGS

- Right auricular mass with pericardial effusion, mild tamponade effect
- Passive congestive pattern noted in the liver without evident ascites
- Splenic nodules, strong concern for splenic hemangiosarcoma
- Mildly enlarged left adrenal gland
- Age-related renal changes

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Palliative pericardiocentesis could be considered, though full right sided failure was not present at the time of the sonogram. Empirical doxorubicin therapy could be considered.

SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™

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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

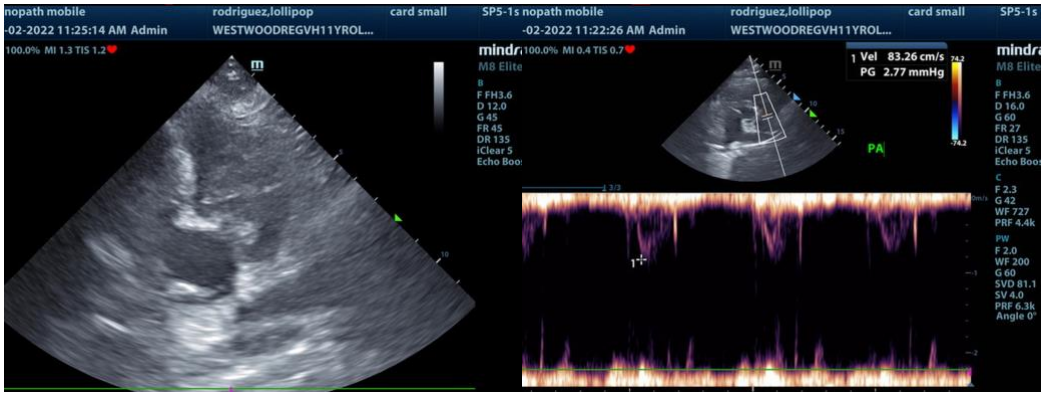
Dr. Taylor McConnell

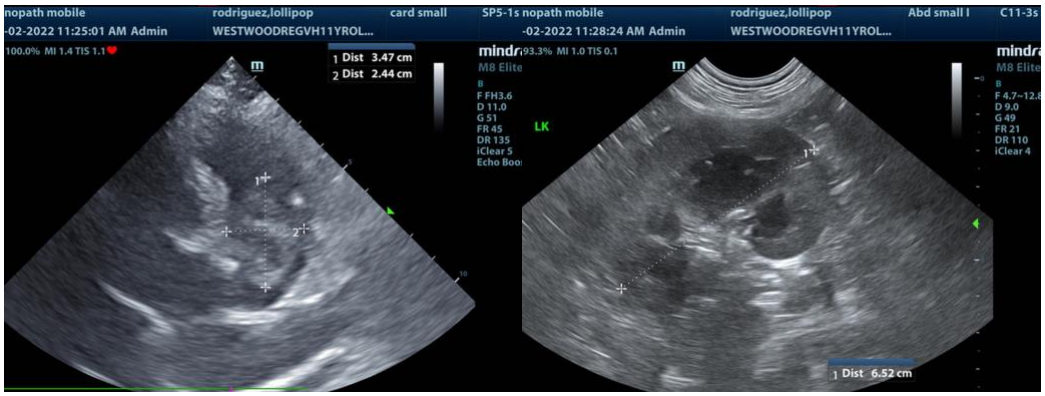
INVOICE

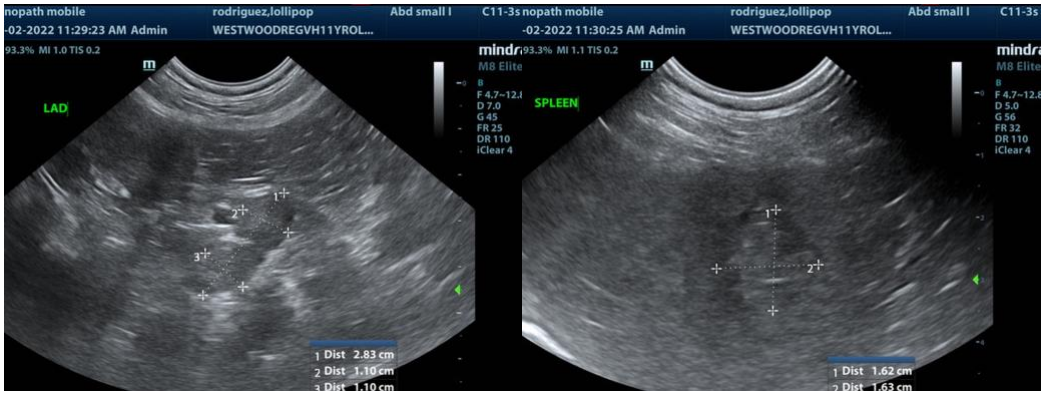
14996

DATE

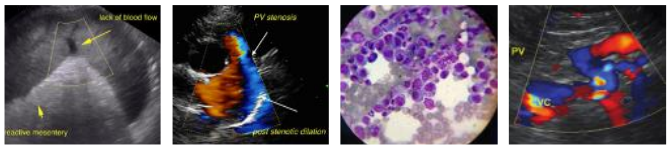
5/2/22







SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

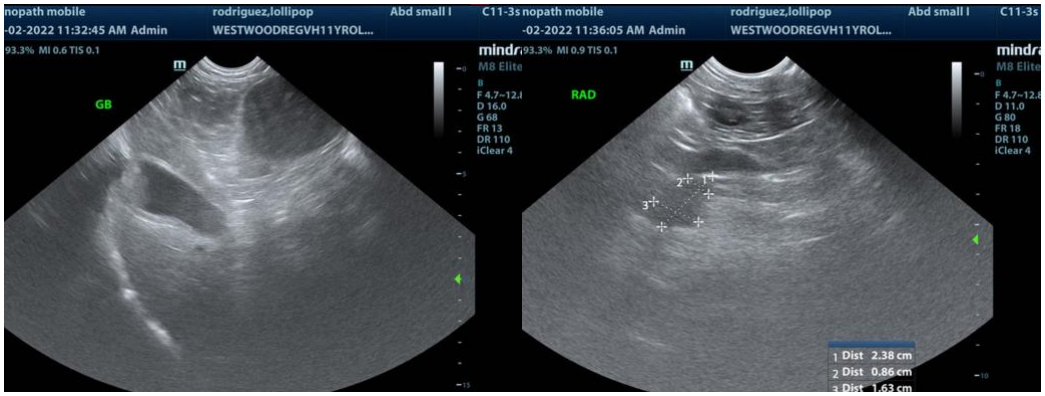
Dr. Taylor McConnell

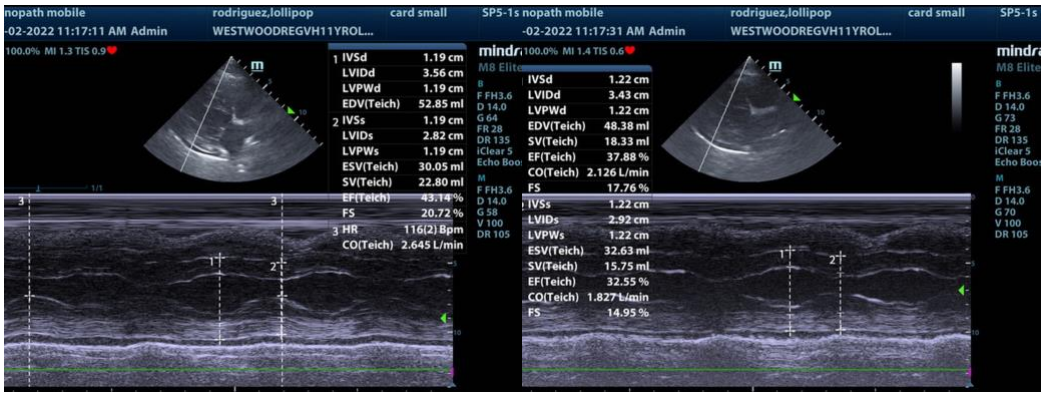
INVOICE

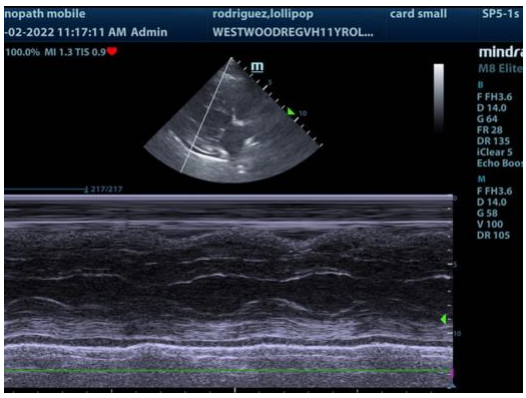
14996

DATE

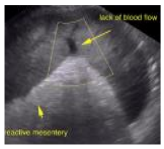
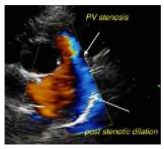
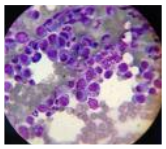
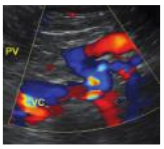
5/2/22







The information and recommendations provided are based on the images presented by the

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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

Dr. Taylor McConnell

INVOICE

14996

DATE

5/2/22

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

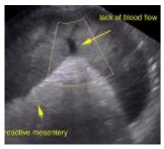
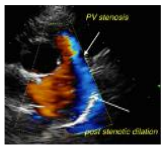
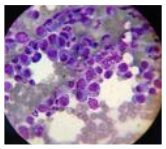
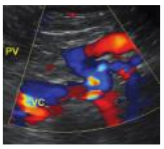
Pericardial Effusion and Cardiac Neoplasia

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:

- 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*)

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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

Dr. Taylor McConnell

INVOICE

14996

DATE

5/2/22

- 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.

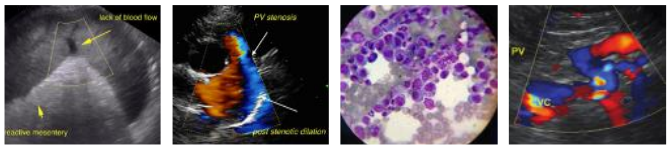
Echocardiography is usually considered the gold standard for diagnosing pericardial effusion. Findings include:

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



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

PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

Dr. Taylor McConnell

INVOICE

14996

DATE

5/2/22

- 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.

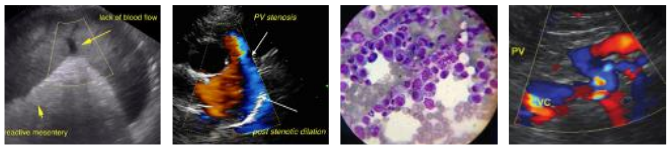
Kienle RD, Thomas WP. Echocardiography. In: Nyland TG and Mattoon JS, eds. *Small Animal Diagnostic Ultrasound, 2nd ed*. Philadelphia, PA: WB Saunders; 2000:354-423.

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.



PATIENT

Lollipop Rodriguez

SPECIES

Canine

BREED

Golden Retriever

SEX

Spayed Female

AGE

11 Years

WEIGHT

81.8 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kelly Vazquez

HOSPITAL NAME

Westwood Regional VH

REFERRING VET

Dr. Taylor McConnell

INVOICE

14996

DATE

5/2/22

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.