
**PATIENT**

Lizzie Manarello

**PRESENTING CLINICAL SIGNS**
**SPECIES**

Canine

**BREED**

Border Collie X

**SEX**

Spayed Female

**AGE**

12.5 Years

**WEIGHT**

14.5 kg

over the past 12 months has steadily increased her ALT values from 132 U/L on 08/07/2020, to most recently up to 235 U/L on 07/23/2021. She has been consistently on carprofen BID for several years, initially treated with 25mg, but owner or previous veterinarian increase dosage to 50 mgs BID. Dr. Hartzell advised owner to reduce dosage when dog as 33 lbs to 37.5 mgs BID around the end of 2020. ALT values continued to trend upward. Dr. Hartzell advise owner to withdraw NSAID for one month in 06/2021, then repeat Chem panel. Results indicated increasing ALT values, despite Carprofen being discontinued and arthritis being managed with Gabapentin 100mg BID. Other blood indices-NSF Dog is asymptomatic with no signs of V/D. PU/PD, Coughing/gagging, appetite is good, and dog is very active, with no evidence of jaundice or melena. Recently dog has developed pruritic symptoms over the past week with NO evidence of ectoparasites, although CA fires have severely impacted area with smoke causing Air Quality Indexes ranging between 300-500+ daily for over the past 2 weeks or more. Update 05/16/2022-ATO dog has developed significant > in dry, non-productive cough occurring several times per day, esp after being sedentary. Additionally, dog has deminished interest in food and < stamina, activity. Owner is currently feeding Royal Canin Hepatic diet and was administering Demarin but has been unable to acquire more, so owner advised to supplement with SAM-e 1/2 tablet SID. Owner has continue with Carprovet 37.5mg BID, after trial with Gabapentin 100mg BID failed to provide OA pain relief. PE 05/16/2022 revealed MM-pink, CRT<2sec, HR-120, RR-pant, T-not taken, H&L-no auscultable murmur but muffled heart sounds on over Right thorax, no pulse deficits or detectable jugular pulse, and no evidence of restrictive airway sound over thorax or trachea, Abdo palp-mild to moderate hepatomegaly but no obvious or abdo masses. Blood results reveals: >ALT 182 IU/L (12-18), > Cholesterol 445 mg/dL (92-324), >Triglyceride 626 mg/dL (29-291), Resting [fasting] Bile Acids 27.3 umol/L (<13)

**INTERPRETED BY**

 Lisa Carioto, DVM,  
 DVSc, Diplomate  
 ACVIM

**IMAGING BY**

 Loetitia Saint-Jacques,  
 LVT

**HOSPITAL NAME**

Critter Care Mobile VC

**REFERRING VET**

Dr. Bruce Hartzell

**ULTRASONOGRAPHIC EXAMINATION OF THE HEART & ABDOMEN**

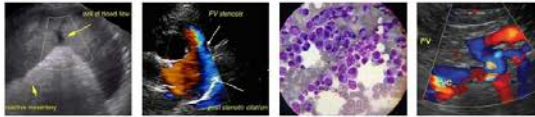
CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (Boon method)	LA/AO (Heart Base; Swedish)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	<1.6	28-40	40-100	<0.6
PATIENT	1	<0.5	NM	1.44	41	NM	NAF
CANINE CARDIAC PARAMETERS	HR (BPM)	AV VMAX (m/s)	PV MAX (m/s)	BODY WEIGHT kg	LA 2D long 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		0.90	0.50	14.5	S <sub>Ax</sub> =2.61	2.53	1.49
Adapted from June Boon, Veterinary Echocardiography, 1998 Sisson D et al. JVIM 1991; 5: 232, and Jacobs et al. Am J Vet Res 1985; 46:1705							

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**DATE**

5/27/22



## PATIENT

Lizzie Manarello **Electrocardiogram** (Six lead ECG)  
Sinus rhythm. No abnormal findings (NAF).

## SPECIES

Canine

### Thoracic radiographs

No obvious signs of metastases  
Cardiomegaly with loss of the cranial waist  
Pulmonary vessels within normal limits; no signs of pulmonary edema  
Mild interstitial and peribronchiolar lung pattern

## BREED

Border Collie X

### Echocardiographic findings

**Mitral valve:** mild myxomatous degeneration of the septal leaflet.  
• No prolapse.

## SEX

Spayed Female

- Trivial to very mild mitral regurgitation.
- Very mild left atrial enlargement
- No left auricular enlargement.

## AGE

12.5 Years

- Reversal of E and A waves
- LA: Ao ratio: Within normal limits (WNL)
- LA normalized for BW (LAN = 1.02); *very mildly* increased
- LVIDd normalized for BW (LVIDND = 1.15); WNL
- LVIDs normalized for BW (LVIDNs = 1.09); WNL

## WEIGHT

14.5 kg

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Lisa Carioto, DVM,  
DVSc, Diplomate  
ACVIM

**Aortic valve:** WNL

- No aortic insufficiency

**Tricuspid valve:** No abnormal findings (NAF).

- Trivial tricuspid regurgitation.

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LVT

- No right ventricular (0.66 cm) or atrial enlargement.

**Pulmonic valve:** no abnormalities

- No pulmonary insufficiency.

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- Main pulmonary artery: No abnormal findings (NAF).
- Pulmonary artery - bifurcation, no abnormalities.
- Pulmonary artery: aortic ratio within normal limits.

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- No signs of heart worm.
- No signs of pleural effusion
- No obvious signs of pericardial effusion

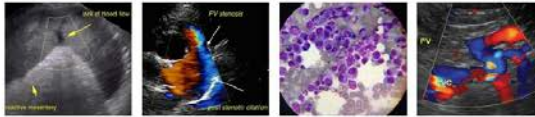
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- Pulmonary veins, no abnormalities.

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[pawsonography@gmail.com](mailto:pawsonography@gmail.com) 530-786-8340

## PATIENT

Lizzie Manarello

- No evidence of pulmonary edema.

## SPECIES

Canine

- Hyperechoic, heterogeneous mass effect arising from or just adjacent to the right ventricular free wall. It is hyperechoic with hypo to anechoic nodules. It measures 1.47 cm (lengthwise along RVFW) x 1.15 cm. Hyperechoic enhancement of the RVFW is observed. The RVFW is mildly heterogeneous with hyperechoic areas.

## BREED

Border Collie X

- The pericardium is thicker and more echogenic than what is considered normal. A restrictive pattern is observed based on the E and A waves, i.e. a restrictive pericarditis of unknown etiology may be present however, overt pericardial effusion is not evident.
- Two possible hypoechoic lesions along pleura, however, artefact associated with rib cannot be excluded.

## SEX

Spayed Female

- Myocardium of the left ventricular free wall: NAF

## AGE

12.5 Years

### Urinary System

The urinary bladder is well distended with anechoic contents. The wall is smooth and regular. No abnormalities are noted with the trigone or proximal urethra, and there is no evidence of sediment, cystoliths, polyps or a mass.

## WEIGHT

14.5 kg

### Kidneys

The **left** kidney measures 4.76 cm. The capsule is smooth. The cortex is mildly hyperechoic and a very mild loss of the normal definition of the cortico-medullary junction is present. Mineralizations of the diverticulae and pelvis are present, without evidence of nephroliths or pyelectasia. The surrounding mesentery is not abnormally hyperechoic.

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Lisa Carioto, DVM,  
DVSc, Diplomate  
ACVIM

The **right** kidney measures 5.20 cm. Findings are similar to the left kidney.

### Aortic bifurcation/trifurcation

No abnormalities observed.

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LVT

### Adrenal Glands

The **left** adrenal gland measures 0.53 cm at the cranial pole, 0.39 cm at the caudal pole. No abnormalities are noted with the gland's overall architecture, echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

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The **right** adrenal gland measures 0.42 cm at the cranial pole and 0.61 cm at the caudal pole. No abnormalities are noted with the gland's overall architecture, echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

## REFERRING VET

Dr. Bruce Hartzell

### Spleen

Subjectively, the spleen is enlarged, however, it maintains its curvilinear architecture and smooth capsule. However, multiple well circumscribed hypo- to isoechoic nodules of variable size are observed throughout the parenchyma. They are not cavitory lesions or vascularized. In one view, in which the body was evaluated longitudinally, the red and white pulp were more apparent than the hypoechoic nodules. No abnormalities are observed with the spleen's vasculature, i.e. congestion and thrombi are not identified.

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## PATIENT

Lizzie Manarello

### **Liver**

There are no obvious signs of hepatomegaly and its borders are smooth and sharp. It is diffusely hyperechoic, and a diffuse, mildly coarse or granular echotexture is observed. A few hypoechoic nodules are observed scattered throughout the parenchyma. A hypoechoic nodule measuring 2.33 cm in diameter x 1.98 cm in length is noted subcapsularly. It does not disrupt the integrity of the capsule. A second hypoechoic nodule is observed in the left liver. It measures 1.8 cm in diameter x 2.25 cm in length. No abnormalities are observed with the hepatic vessels visualized. The gallbladder wall is within normal limits in thickness and echogenicity. A very small amount of echogenic material is present within the GB. The portions of the cystic and/or common bile ducts observed are not dilated or tortuous, i.e. there are no signs of an obstruction.

## SPECIES

Canine

## BREED

Border Collie X

## SEX

Spayed Female

### **Gastrointestinal**

The gastric wall is within normal limits in thickness and the wall layers are well defined. No obvious abnormalities are observed with its peristalsis.

## AGE

12.5 Years

The small intestinal wall thickness, including the duodenum, is within normal limits and the definition of the wall layers is preserved. Abnormally dilated loops of bowel are not observed. The colonic wall is not thickened and mural detail is considered normal.

There are no obvious signs of a mass, foreign body, infiltrative disease or an obstruction in the gastrointestinal tract.

## WEIGHT

14.5 kg

### **Pancreas**

The pancreas has a mildly coarse echotexture, which is considered secondary to age related changes, however, previous episodes of pancreatitis cannot be excluded. There are no signs of active pancreatitis or neoplasia.

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### **Other**

#### **Lymph nodes**

No abnormalities are observed

**Abdominal effusion** is not visualized.

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## ULTRASONOGRAPHIC FINDINGS

- Heterogeneous mass effect arising from or just adjacent to the right ventricular free wall. Differential diagnoses include a carcinoma, hemangiosarcoma, and lymphoma. Histiocytic sarcoma is less likely, but cannot be excluded based on the splenic abnormalities observed. Although less likely, one cannot rule out the possibility of a blood clot that is becoming reorganized.
- A restrictive pericarditis of unknown etiology is suspected.
- The pleural wall also appears thicker and more echogenic than what is considered normal. Two possible lesions are noted along the pleura, which may be due to metastases. However, artefact associated with ribs cannot be excluded.
- Myxomatous degeneration of the mitral (mild), ACVIM stage B2, i.e. very mild left atrial enlargement. This finding is not associated with Lizzie's clinical signs.

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## PATIENT

Lizzie Manarello

- **Liver:** Vacuolar and reactive hepatopathies are suspected, in addition to nodular hyperplasia. Although target-like lesions are not observed, one cannot exclude the possibility of neoplasia based on Lizzie's clinical signs and abnormalities noted with her spleen and echocardiogram.

## SPECIES

Canine

- **Spleen:** The multifocal, heterogeneous echotexture composed of hypoechoic nodules is suggestive of infiltrative disease, such as lymphoma, other round cell tumour, histiocytic sarcoma, etc. Although much less likely, hypersplenism, nodular hyperplasia and splenitis remain potential differential diagnoses, therefore, an ultrasound-guided fine needle aspirate is strongly recommended.

## BREED

Border Collie X

**Kidneys:** Bilateral renal changes are suggestive of age related degeneration. There are no obvious signs of glomerulonephritis or pyelonephritis.

## SEX

Spayed Female

- **Pancreas:** Age related pancreatic changes are observed. There are no signs of active pancreatitis or neoplasia.

## AGE

12.5 Years

A low dose of dexamethasone (0.03-0.05 mg/kg) may help decrease inflammation and slow the progression of pericardial fibrosis and pericarditis. However, ideally, steroids should not be administered before pursuing further diagnostics, i.e. fine needle aspirates of the spleen and liver.

## WEIGHT

14.5 kg

Treatment with an anti-tussive may be administered to help control Lizzie's cough, as needed. For example, hydromorphone or codeine.

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DVSc, Diplomate  
ACVIM

Arterial blood pressure to exclude hypotension

A SNAP 4Dx and PCR tests to evaluate for tick borne diseases may be required pending the cytology results.

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Treatment with an anti-tussive may be administered to help control Lizzie's cough, as needed. For example, hydromorphone or codeine.

Pending the decision to use steroids, analgesics consisting of gapriprant (Galliprant) may be less harsh on the liver, kidneys and GI tract, gabapentin every 8 hours, methadone and acupuncture may be considered.

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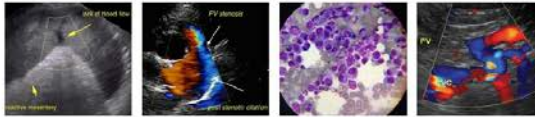
Note, SAM-e can occasionally cause nausea.

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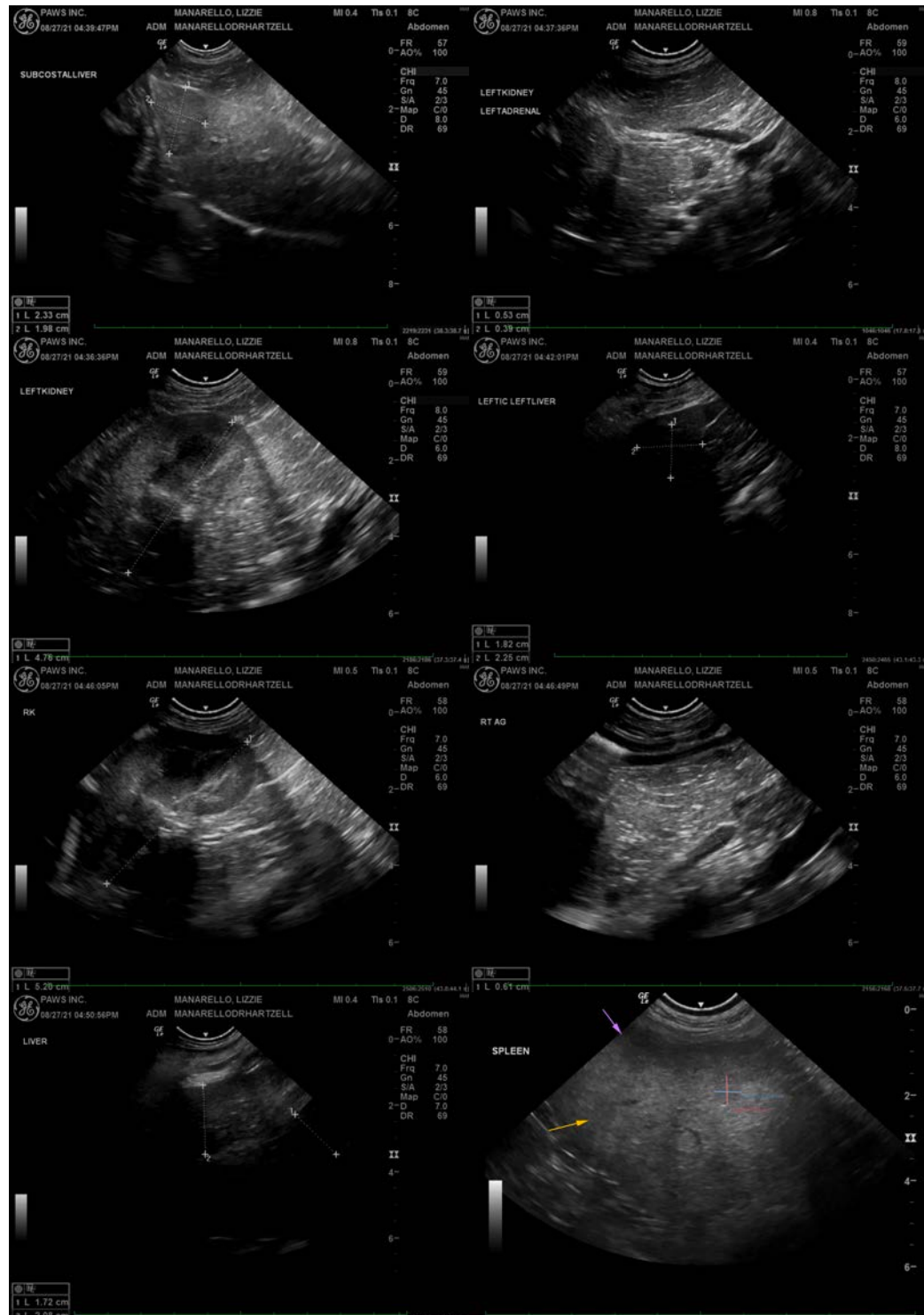
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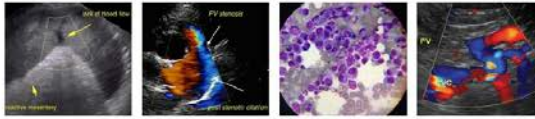
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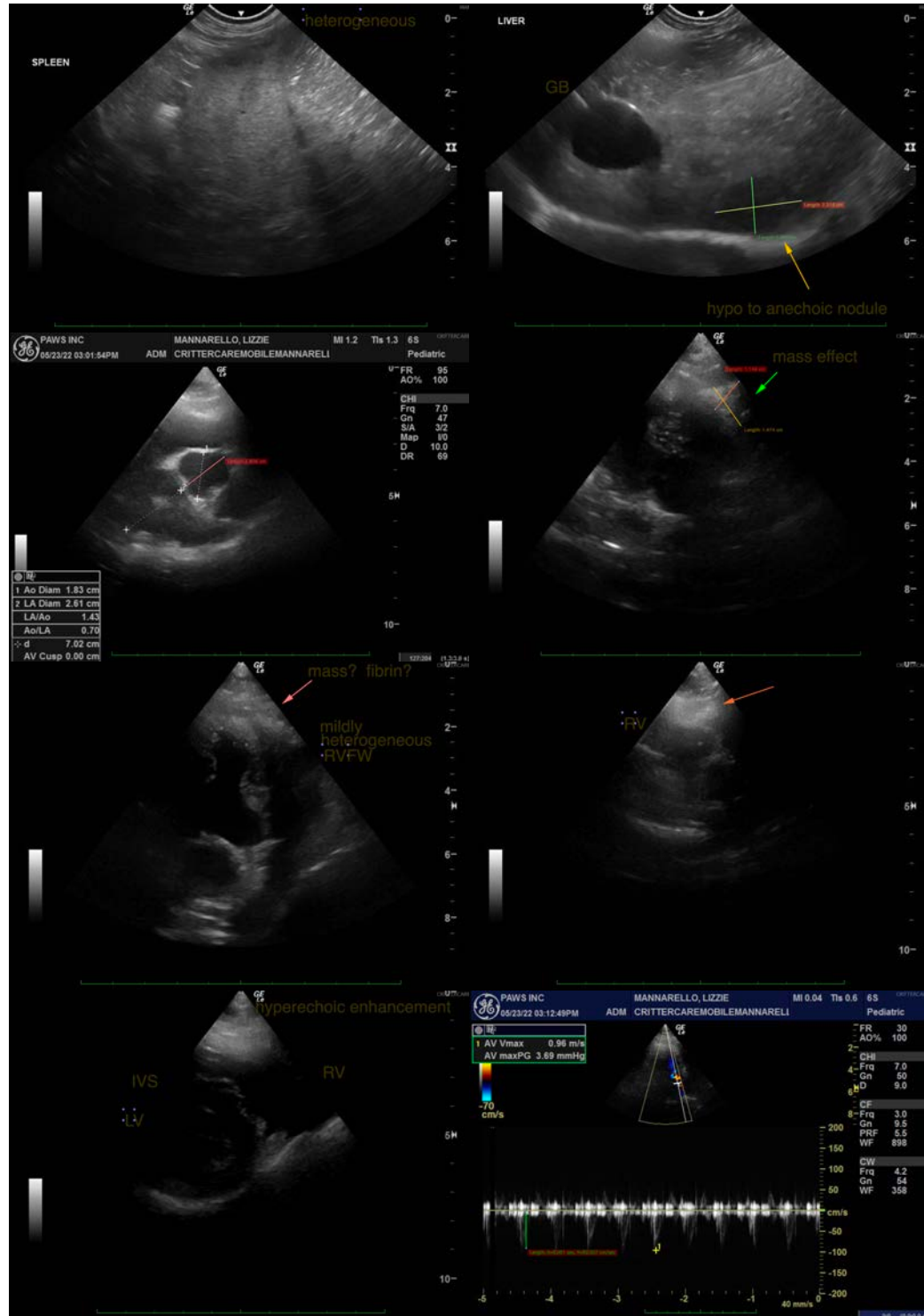
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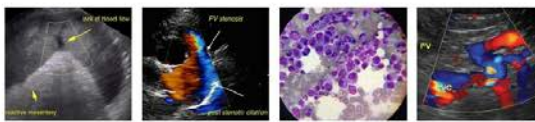
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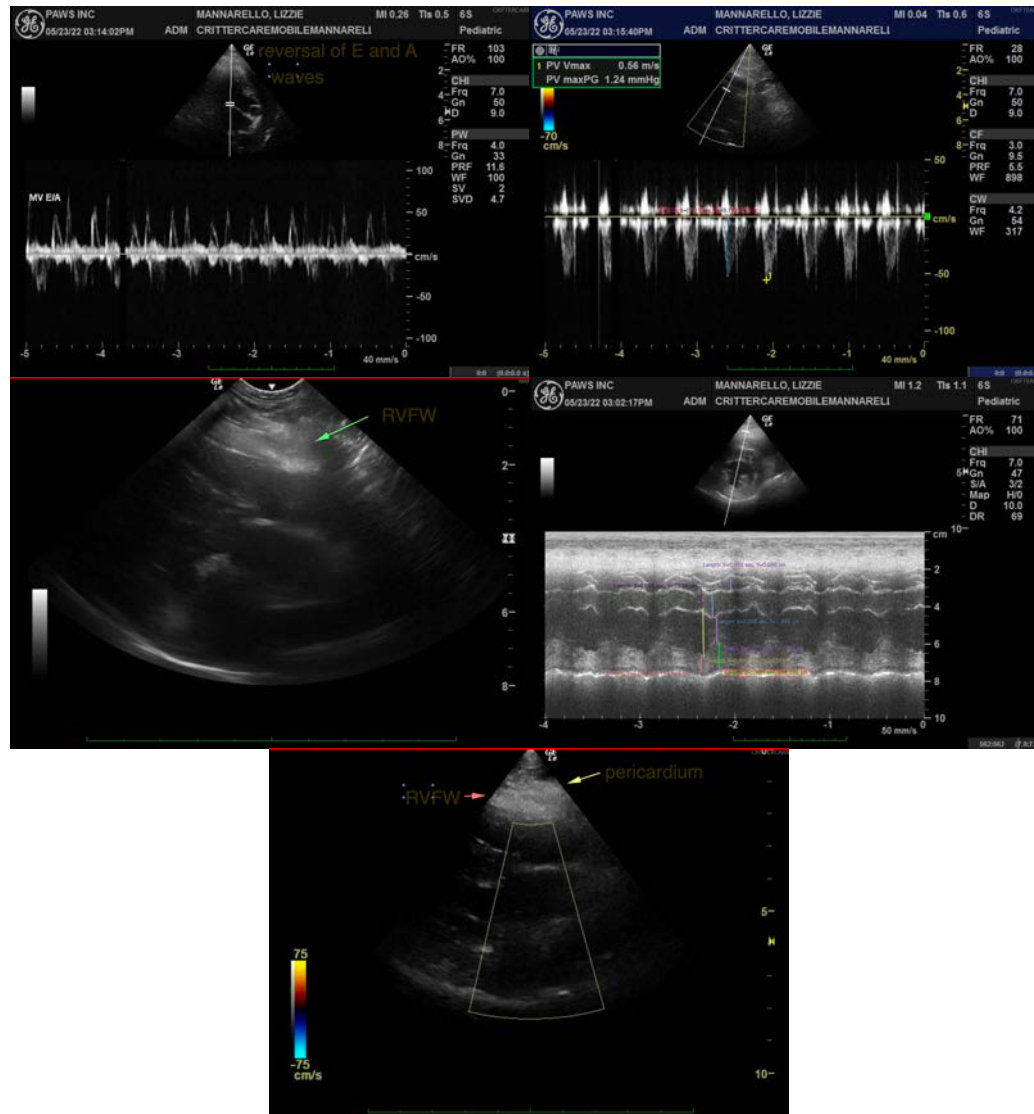
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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

**Lisa Carioto, DVM, DVSc, Diplomate AVIM**

[Lisa.Carioto@sonopath.com](mailto:Lisa.Carioto@sonopath.com)