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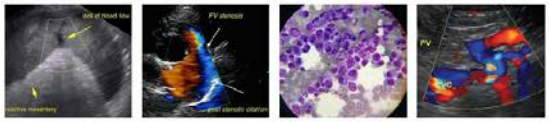

IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

**PATIENT**

Lily The Dog Ranch

**SPECIES**

Canine

**BREED**

Terrier X

**SEX**

Spayed Female

**AGE**

11 Years 11 Months

**WEIGHT**

21 Pounds

**INTERPRETED BY**

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

**IMAGING BY**

Loetitia Saint-Jacques, LVT

**HOSPITAL NAME**

MountainView AH

**REFERRING VET**

Dr. Sarah Kalivoda

**INVOICE**

38062

**DATE**

5/26/22

## PRESENTING CLINICAL SIGNS

Chief Concern / Provisional Diagnosis: ~ p. has an enlarged liver and gall bladder w/ sludge/debris noted 4/19/2022 on brief abd. u/s liver palpates enlarged on exam concern for cholecystitis/hepatopathy +/- cushing's disease Relevant Medical History and Physical Exam findings: ~ concern for abdominal distension and smaller than normal stools at home Recent Diagnostics: Relevant Labratory Results / Abnormalities: ~ normal cbc alt 461 (normal 1 year ago), alkp 1818 (~400 1 year ago) chol 328 Current medications (include full name, dosage and frequency): ~ fluoxetine 20 mg po sid

## ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

### *Urinary System*

The urinary bladder is well distended. The wall is smooth and regular. No abnormalities are present with the trigone or proximal urethra. A small amount of free floating sediment is present, however, there is no evidence of cystoliths, polyps or a mass.

**Kidneys**

The **left** kidney measures 5.18 cm. The capsule is smooth. The cortex is mildly hyperechoic (mildly hyper to spleen). A 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. An accumulation of intrapelvic fat is noted. The surrounding mesentery is not hyperechoic.

The **right** kidney measures 5.12 cm. Blood flow is within normal limits. Findings are similar to the left kidney.

**Aortic bifurcation/trifurcation**

No abnormalities observed.

### *Adrenal Glands*

The **left** adrenal gland measures 0.83 cm at the cranial pole, 0.76 cm at the caudal pole. Both poles are enlarged and plump, however, the gland's overall architecture is preserved. A well-defined hyperechoic area is observed at the medial aspect of the cranial pole which may represent an area of fat, fibrosis, an infarct, and/or mineralization. The distal portion of the cranial pole is hypoechoic and measures 0.53 cm in diameter x 0.51 cm in length. This hypoechoic area may be an area of nodular hyperplasia or regeneration and is most likely an age related change. The caudal pole also has ill-defined hyperechoic punctate foci. The differential diagnoses are similar to the cranial pole. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

The **right** adrenal gland measures 1.02 cm at the cranial pole, 1.08 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.

### *Spleen*

The spleen is within normal limits in size, architecture, echotexture, and echogenicity. The capsule is smooth. No abnormalities are observed with its vasculature, i.e. congestion and thrombi are not identified.

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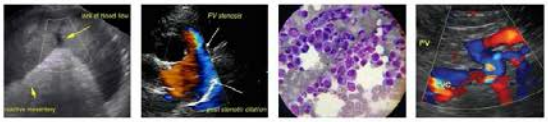

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### *Liver*

Mild hepatomegaly is suspected, however, this is better characterized at the time of the ultrasound or with radiographs. The liver's borders are smooth and vary between sharp to very mildly rounded. It is diffusely hyperechoic, and a diffuse, mildly coarse or granular echotexture is observed. A few hypoechoic nodules are noted. For example, 0.86 cm in diameter by 1.38 cm in length. The largest measures 1.35 cm in diameter by 1.29 cm in length. The latter is subcapsular and does not affect the integrity of the capsule. No abnormalities are observed with the hepatic vessels visualized.

The gallbladder (GB) is mildly to moderately distended with a moderate amount of free floating gravity depended, and inspissated echogenic material (sludge), some of which is immobile. The GB wall is within normal limits in thickness and echogenicity. 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.

### *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.

The small intestinal wall thickness, including the duodenum, is within normal limits. Although the definition of the wall layers is preserved, mild fogging and stippling of the mucosa are present. 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.

### *Pancreas*

No overt abnormalities are observed with the echogenicity or echotexture of the left limb. There is no evidence of hyperechogenicity of the surrounding mesentery, i.e., signs of active pancreatitis are not present.

The right limb has a mildly to moderately coarse echotexture, and is mildly heterogeneous. It consists of hypoechoic nodules of variable size and pinpoint to punctate hyperechoic foci scattered throughout the parenchyma. These changes are suggestive of nodular hyperplasia and fibrosis, respectively. Both of which are considered age-related changes. Fibrosis may also occur secondary to previous episodes of pancreatitis, mineralization, ischemia, and amyloid deposition. Signs of active pancreatitis and neoplasia are not appreciated.

**Other**

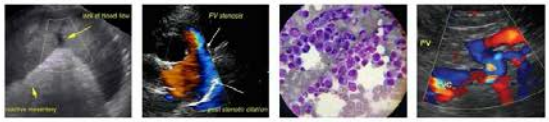
**Lymph nodes**

No abnormalities are observed with mesenteric LNs (measurements and appearance WNL).

**Abdominal effusion** is not visualized.

**Heart**

A brief video clip of the heart was submitted. Pericardial and pleural effusion are not identified. A mass is not observed on evaluation of the cardiac chambers. Note, a mass may be overlooked in





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the absence of pericardial effusion. No obvious abnormalities with contractility (measurements not performed).

## ULTRASONOGRAPHIC FINDINGS

• **Bilateral adrenomegaly**. Pituitary dependent hyperadrenocorticism is suspected, however, adrenal hyperplasia secondary to chronic illness (stress), cannot be excluded. The hyperechoic punctate regions observed appear benign and may be due to fat, mineralization, fibrosis, or an infarct (left adrenal, as it is more organized). Age-related changes are suspected as the cause of the hypoechoic nodule at the cranial pole of the left gland. There are no signs of neoplasia and the surrounding vasculature is unremarkable.

• **Liver**: Vacuolar and reactive hepatopathies are suspected, in addition to nodular hyperplasia. Target-like lesions are not observed, i.e. the hypoechoic nodules are unlikely to be neoplastic. Cholestasis is also likely present. Hepatotoxicity secondary to the administration of fluoxetine must be considered if the medication was recently introduced or if the dose was recently increased. Cholangitis/cholangiohepatitis and cholecystitis with a secondary bacterial infection cannot be excluded based on the appearance of the gallbladder.

• **Gallbladder**: The appearance of Lily's gallbladder is not consistent with a classical mucocoele, however, it may be a mucocoele in its early development or a mucocele that will not have a typical appearance. Cholecystitis with a secondary bacterial infection cannot be excluded. Dogs with hyperadrenocorticism are more predisposed to gallbladder sludge and developing mucocoeles. Also, some dogs may show clinical signs of gastroesophageal reflux disease (GERD) as a result of the sludge. Therefore, obtaining a history regarding signs of GERD from the client is suggested. Treatment with an anti-acid, proton pump inhibitor or ursodeoxycholic acid may be required depending on the patient's history.

• **Urinary bladder**: The free floating sediment within the lumen of the urinary bladder is most likely composed of mucus, crystalline material and exfoliated cells. The debris is likely clinically insignificant given the lack of inflammatory changes to the bladder wall, however, findings should be correlated with clinical signs and a urinalysis.

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

• **Gastrointestinal**: Major abnormalities are not observed. The mild fogging and stippling of the mucosa of the small intestines are somewhat subjective. Although these findings may not be clinically significant, they have been associated with GI inflammation, therefore, enteritis may be present. Evaluation of Lily's diet is suggested, including fibre sources. Constipation may also occur due to subclinical dehydration and an evaluation of water consumption is suggested.

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

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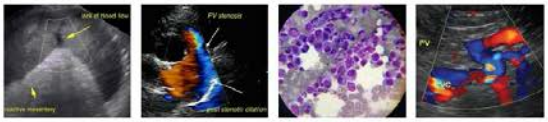

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## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Obtaining a history regarding signs of GERD from the client is suggested. Treatment with an anti-acid, proton pump inhibitor or ursodeoxycholic acid may be required depending on the patient's history.

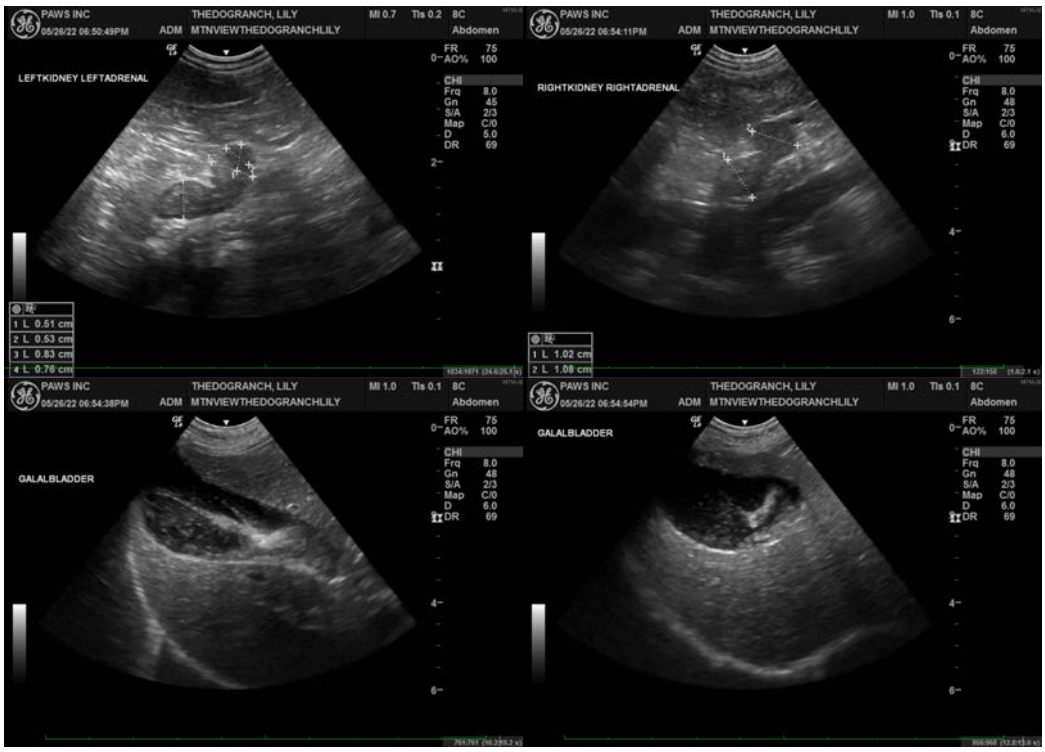
An evaluation of her diet and water consumption may also help determine an underlying cause of constipation.

Other suggestions/recommendations include

Excluding a urinary tract infection, i.e. a urine protein: creatinine ratio is suggested as proteinuria may occur with hyperadrenocorticism. False negative results for protein may occur on dipsticks with urine specific gravities less than 1.020.

An arterial blood pressure is recommended to rule out hypertension.

An ACTH stimulation test or low-dose dexamethasone suppression test is suggested, based on Lily's clinical signs. Note, differential diagnoses include cholecystitis, cholangitis/cholangiohepatitis, and secondary ascending bacterial infections. Although indiscriminate use of antibiotics is not recommended, consider broad-spectrum antibiotics with reassessment of liver enzymes, including GGT, in a few weeks, while *still receiving* the antibiotics. If an improvement is observed, continue antibiotic for an additional two weeks and postpone further diagnostics of HAC in the interim.



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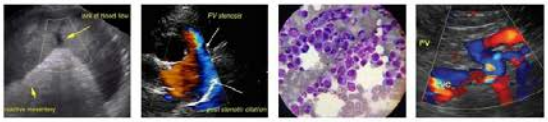

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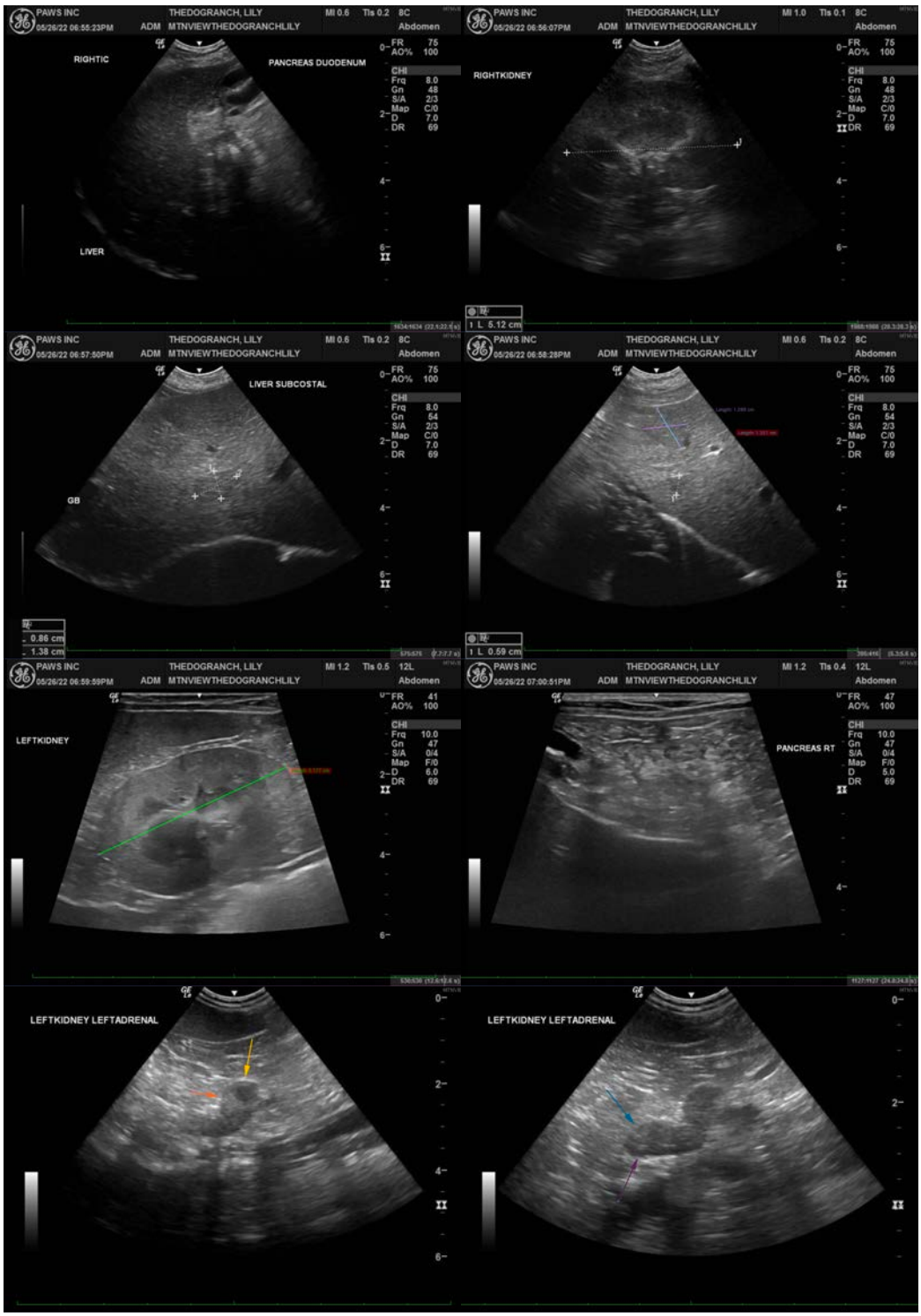

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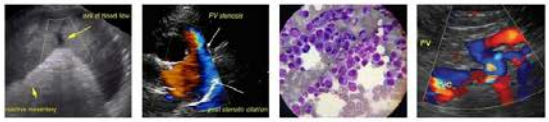

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**The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.**

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