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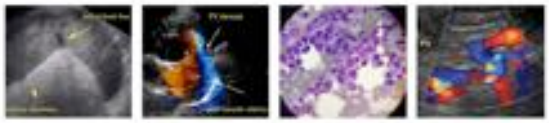

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pawsonography@gmail.com 530-786-8340

PATIENT

Leila Holland

SPECIES

Canine

BREED

Terrier Mix

SEX

Spayed Female

AGE

12 years

WEIGHT

15.4 lbs

INTERPRETED BY

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

IMAGING PERFORMED BY

Loetitia Saint-Jacques, RVT

HOSPITAL NAME

Valley VC

REFERRING VET

Dr. Lopez

INVOICE

31329

DATE

6/29/22

PRESENTING CLINICAL SIGNS

NOT SEDATED- Chief Concern/Provisional Diagnosis: P has chronic elevated liver enzymes. No clinical signs at this time. Diagnosis: DDX: hepatomegaly, neoplasia, hepatitis History/Physical Findings: BCS: 7/9 Hydration status: WNL MM Pink, capillary refill time less than 2 seconds. Heart auscultates normally, no murmur or arrhythmia noted. Lungs auscultate normally. Hair coat appears healthy. OU appear normal. AU are clean in visible ear canal. Nose appears normal. Mouth appears to have grade 1/4 periodontal disease. LN are WNL. Abdomen palpates normally with no palpable masses. No signs of lameness. Left medial luxating patella, Grade 2/4. BW done on 6/17/22 ALT=205. ALP=2725. In January 2022 ALT was 120 and ALP was 1524. Radiographic Abnormalities: No radiographs taken at this time. Current Therapy and Medications: liquitinic 2.5 ml PO BID

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The **urinary bladder** is fully distended. A large amount of **free floating** sediment is observed, in addition to hyperechoic sediment. The sediment, (approximately 7.3 mm in length), casts an acoustic shadow where it has settled by gravity along the ventral wall. No abnormalities are noted with the trigone and urethra.

Kidneys

The **left** kidney measures 4.16 cm. The capsule is smooth. The cortex is hyperechoic, i.e. it is isoechoic to the 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. The surrounding mesentery is not hyperechoic.

The **right** kidney measures at least 4.00 cm. The capsule is very mildly irregular. A miniscule, anechoic nodule approximately 2 mm x 2 mm, is noted at the cranial pole, which is most consistent with a benign cyst. Findings are otherwise 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, 0.48 cm at the caudal pole. A well-defined nodule is observed at the cranial pole, however, there is no evidence of neoplasia. No abnormalities are noted with the gland's overall echogenicity or echotexture, despite the presence of the nodule. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

The **right** adrenal gland measures 0.82 cm at the cranial pole, 0.77 cm at the caudal pole and 2.09 cm in length. A well-defined, hyperechoic nodule, is present toward the cranial pole. It measures 0.86 cm in diameter x 0.89 cm in length. No abnormalities are noted with the phrenico-abdominal vein, surrounding vasculature, or surrounding mesentery.

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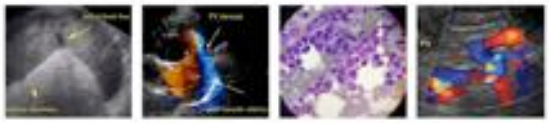

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Spleen

The spleen is within normal limits in size, architecture, echotexture, and echogenicity. The capsule is smooth. Multiple hyperechoic nodules, (for example, measuring 2.9 mm in diameter x 4.5 mm in length), are noted. The nodules may be due to mineralization and/or fat, as well as, fibrosis. Perivascular cuffing, consistent with myelolipomas, is also observed. No abnormalities are observed with its vasculature, i.e. congestion and thrombi are not identified.

Liver

There are no obvious signs of hepatomegaly and its borders are smooth and sharp. The liver's echotexture is homogeneous and it is within normal limits in echogenicity.

A mildly hypoechoic (almost isoechoic) nodule, measuring 1.10 cm in diameter x 1.20 cm in length, is noted.

A homogeneous, hyperechoic nodule, measuring 1.65 cm in diameter x 1.77 cm in length, is also observed. A second hyperechoic nodule, measuring, 0.98 cm in diameter, is also visualized. The two hyperechoic nodules are suggestive of regeneration, fat, and possible fibrosis. Neither of these nodules are vascularized.

A small, well-defined, hyperechoic nodule, 0.28 cm in diameter x 0.34 cm in length, is observed. The latter is more echogenic than the two larger hyperechoic nodules, and more consistent with mineralization and/or fat. No obvious abnormalities are noted with the hepatic vessels.

The **gallbladder** (GB) wall is within normal limits in thickness and echogenicity. A marked amount of free floating, gravity-dependent and inspissated, echogenic material is present within the GB. There is no evidence of dilation or tortuosity of the common bile duct, i.e. there are no signs of an obstruction.

Gastrointestinal

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

A large amount of gas and ingesta are present within the lumen of the duodenum. 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.

Pancreas

The pancreas has a moderately coarse echotexture, which is likely due to a combination of age related changes, such as nodular hyperplasia and fibrosis, however, previous episodes of pancreatitis cannot be excluded. There are no signs of active pancreatitis or neoplasia.

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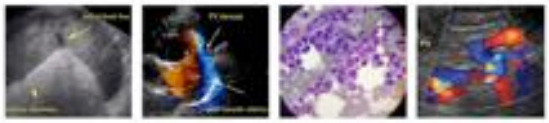

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Other

Lymph nodes

The PD lymph node measures 0.43 cm in diameter x 0.76 cm in length. The surrounding mesentery is mildly to moderately hyperechoic.

Abdominal effusion is not visualized.

ULTRASONOGRAPHIC FINDINGS

- **Liver**: The hypoechoic nodules are most likely due to nodular hyperplasia. The hyperechoic nodules are suggestive of regeneration, fat, and possible fibrosis. The small, more echogenic nodule, is more consistent with mineralization and/or fat. Target-like lesions are not visualized, i.e. signs of neoplasia are not evident.

- **Gallbladder**: A marked amount of gallbladder **sludge** is present. Although classical sonographic signs of a mucocoele are not evident, a mucocoele in development cannot be excluded. Cholangitis/cholangiohepatitis and secondary bacterial infections ascending from the gastrointestinal tract cannot be excluded. Signs of cholecystitis are not evident. The biliary changes may be contributing to the increased hepatic enzyme activities. Obtaining a history regarding signs of GERD from the client is suggested as gallbladder sludge may cause signs of gastroesophageal reflux disease (GERD), in some patients. Treatment with an anti-acid, proton pump inhibitor or ursodeoxycholic acid, may be considered.

- **Adrenal glands**: A nodule is observed at the cranial pole of the left gland and the mid to cranial pole of the right. The nodule affecting the left is well defined, and suggestive of a benign adenoma. The nodule on the right is also well-defined, but hyperechoic, and more consistent with fat (a myelolipoma), mineralization, fibrosis, as well as, nodular hyperplasia. Both glands are also mildly enlarged, which may be caused by adrenal hyperplasia secondary to pituitary-depending hyperadrenocorticism (HAC). The latter may cause increased liver enzyme activities.

- **Urinary bladder:** Hyperechoic, mineralized **sediment** is present. A urinary tract infection cannot be excluded despite the absence of inflammatory changes to the mucosa.

- **Kidneys**: Very mild mineralizations may be due to age-related changes, genetics, as well as diet. Other subtle changes are suggestive of age-related degeneration. A diagnosis of pyelonephritis cannot be excluded despite the absence of classical sonographic signs.

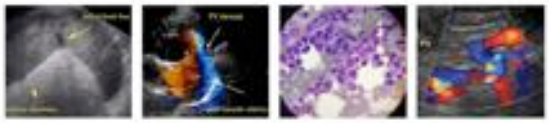
- **Pancreas**: Although changes are suggestive of age-related changes, previous episodes of pancreatitis cannot be excluded. There are no signs of active pancreatitis or neoplasia.

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The following are suggested/recommended

A urinalysis and urine culture

The urine sediment may be passed through cheese cloth or gauze and submitted for analysis to



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determine if it is struvite in origin. If struvite crystalluria and sediment are present, dietary dissolution, with concomitant administration of antibiotics (if a UTI is present) may be considered.

Ensure adequate water consumption (i.e., canned food should be prioritized, or as much water as possible should be added to dry food).

Allow for frequent voiding; if once daily antibiotics are administered, give at night, etc.

Basic urine hygiene to decrease risk of recurrence of infections.

If the urinalysis is negative, a urine protein: creatinine ratio is suggested

An arterial blood pressure

Obtaining a history regarding signs of GERD from the client is suggested. Treatment with an anti-acid, proton pump inhibitor (0.7-1 mg/kg PO q12h) or ursodeoxycholic acid may be required.

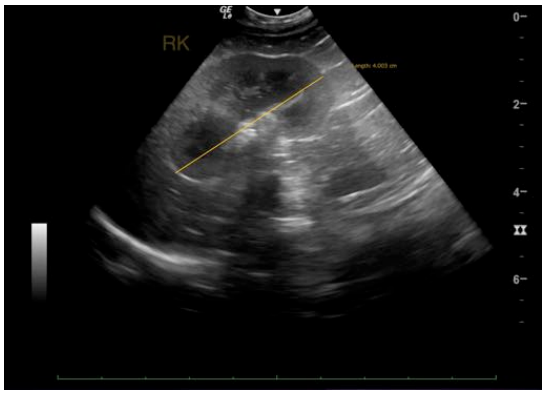
ursodeoxycholic acid (Ursodiol) may be considered. It should be introduced at a low dose, and slowly up-titrate to decrease the risk of GI side effects. For example, 3 mg/kg PO once a day for 5-7 days, then 5 mg/kg PO once a day for 5-7 days, then 7.5 mg/kg PO once a day for 5-7 days, then 10 mg/kg PO once a day for 5-7 days. The dose should be divided BID and given with a meal to decrease the risk of nausea, cramps, vomiting and diarrhea.

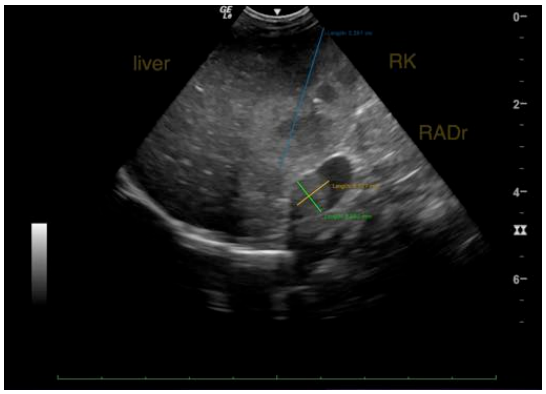
Fasting triglycerides are suggested to exclude hypertriglyceridemia as a predisposing cause of gallbladder sludge.

A decision to pursue further diagnostics for hyperadrenocorticism should be correlated with Leila's clinical signs, or whether she has proteinuria and/or hypertension. That is, treatment for HAC is not necessarily indicated (depending on the internist one speaks to) if the patient is not demonstrating clinical signs of the disease or if not suffering from proteinuria or hypertension.

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.

If liver enzyme activities continue to increase despite the above suggestions, a fine needle aspirate, or preferably a tissue biopsy, is suggested, pending a coagulation profile.





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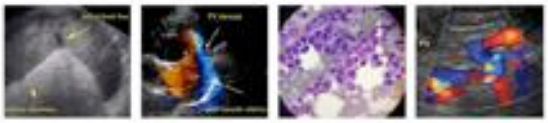

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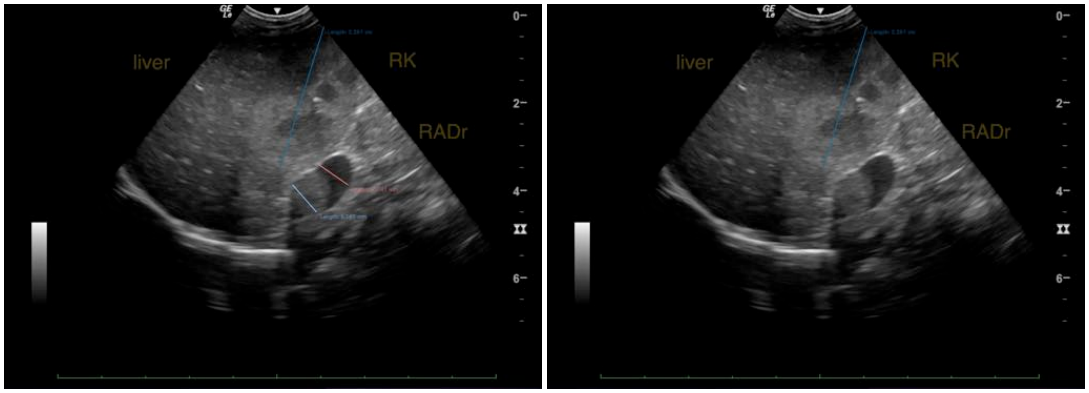

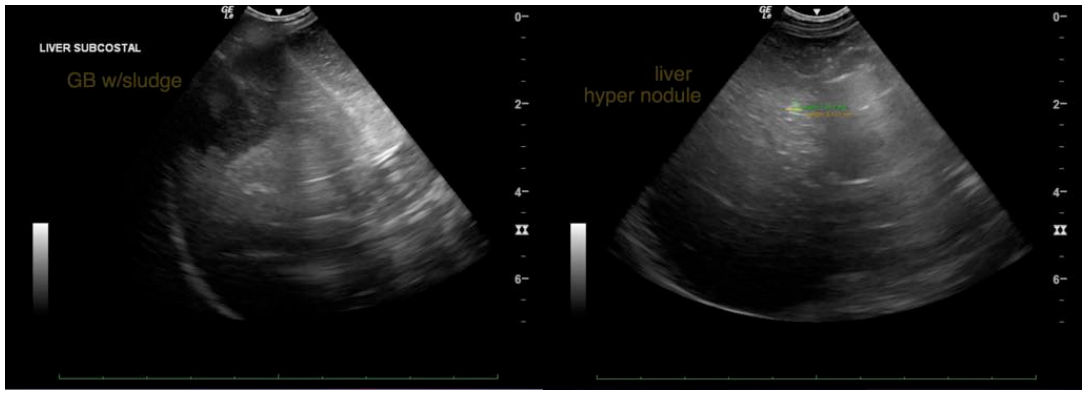

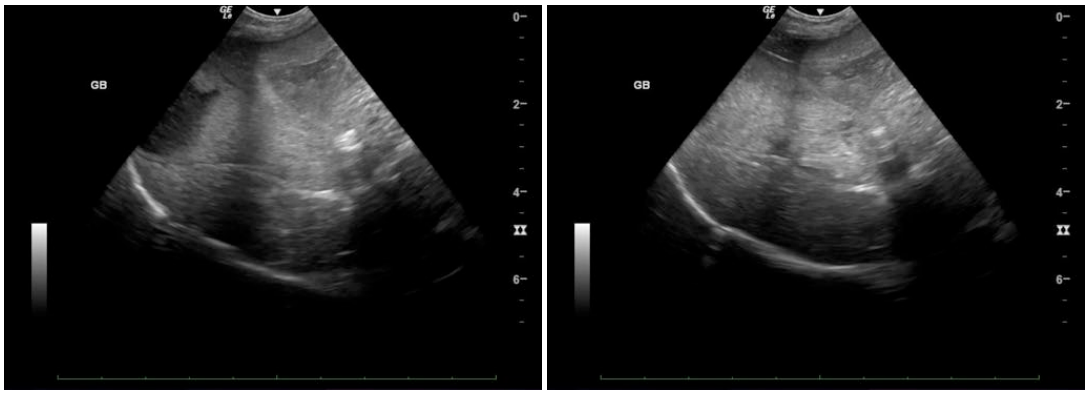

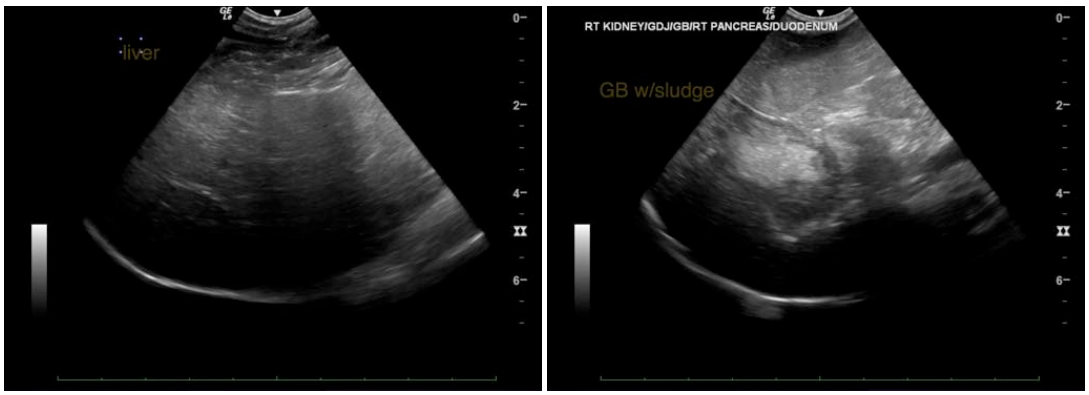

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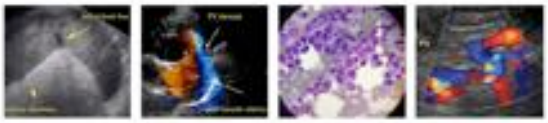

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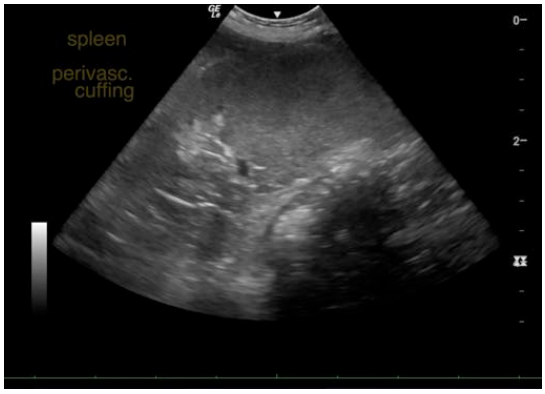

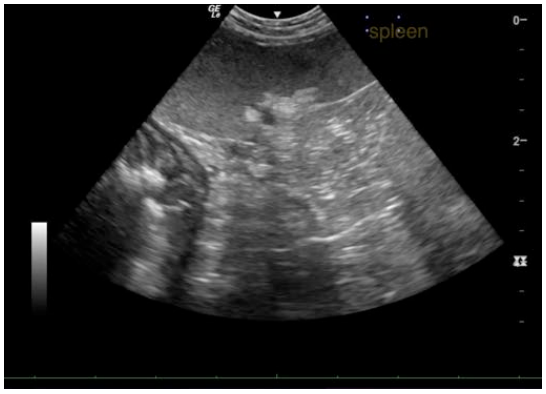

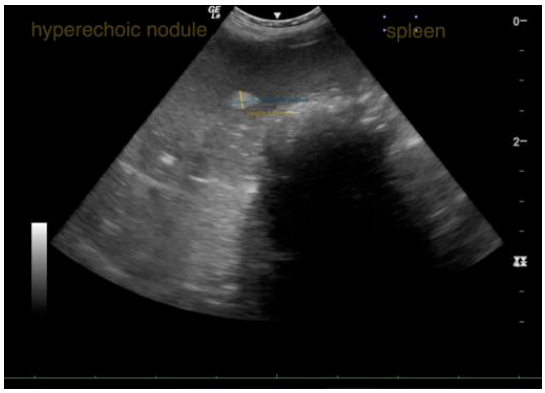

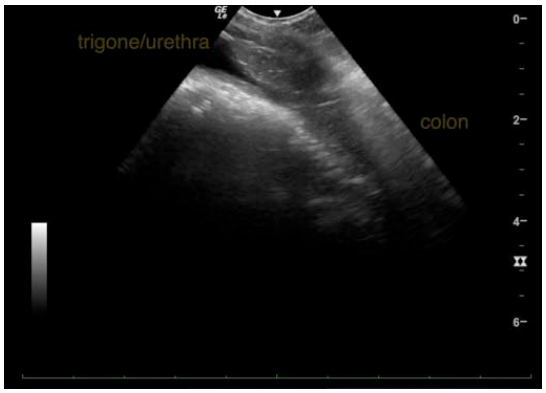

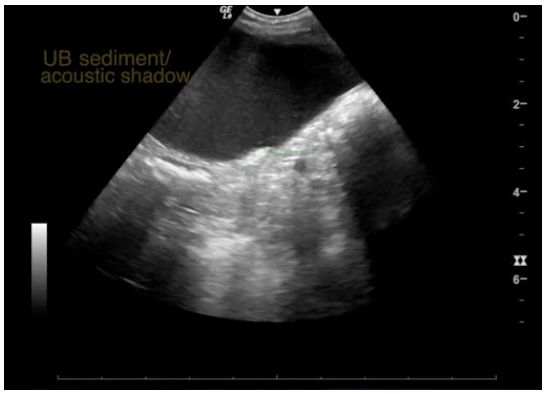

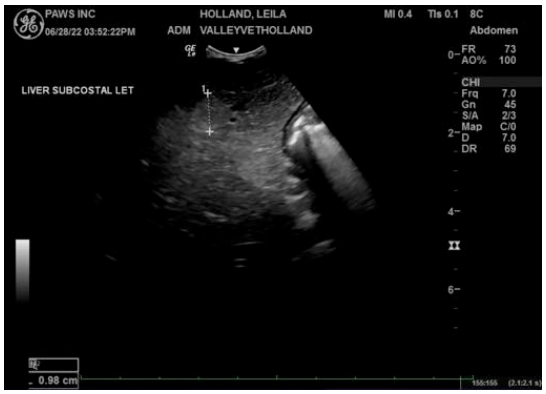

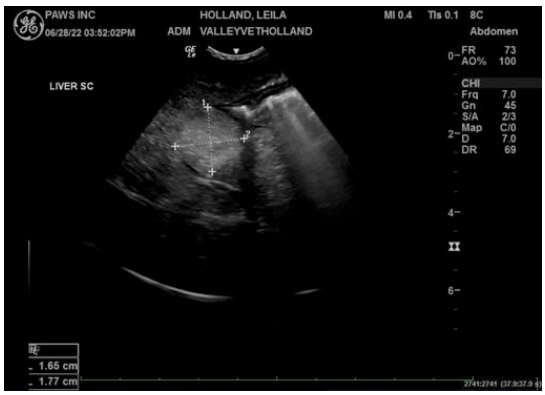

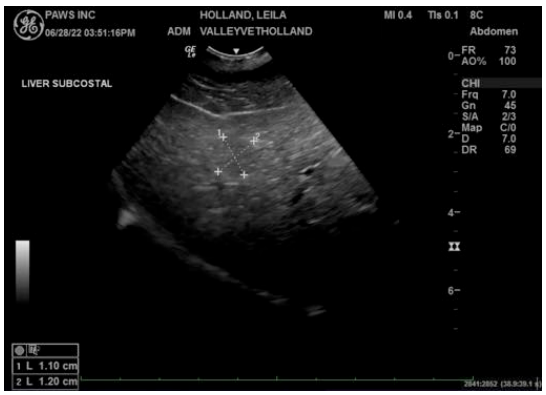

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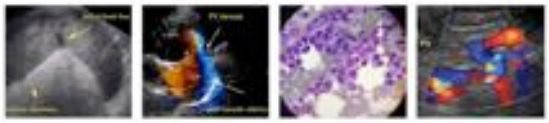

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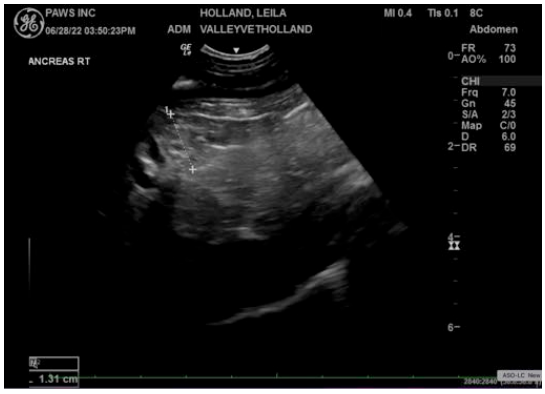

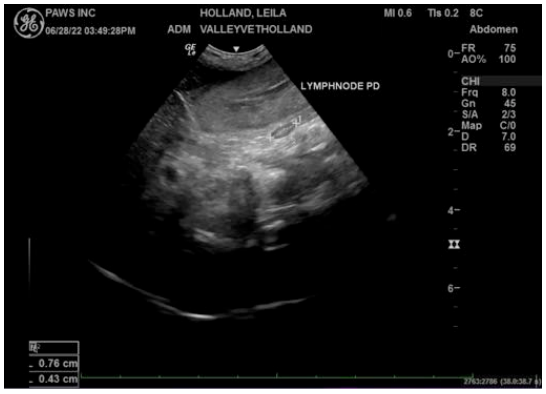

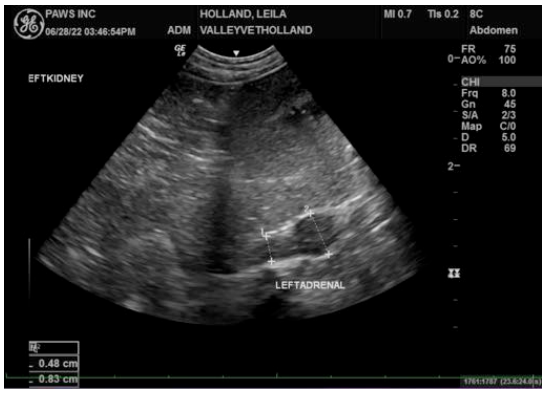

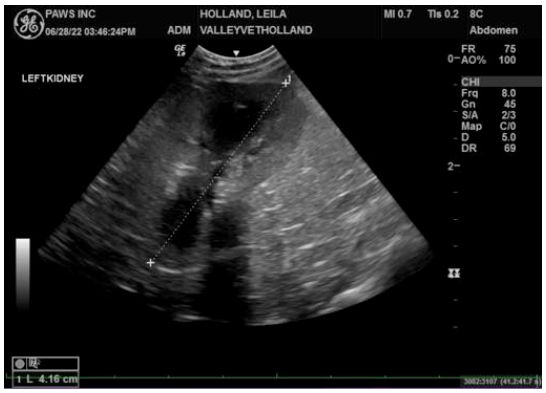

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Thank you for this referral. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance please contact me.

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