IMAGING PERFORMED BY

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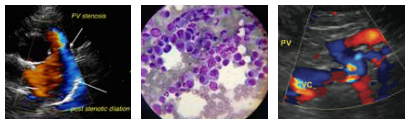


SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

DATE
6/23/22

PATIENT
Zelda Holder

SPECIES
Canine

BREED
Labrador

SEX
Spayed Female

AGE
10/23/14

WEIGHT
71.2 lbs

INTERPRETED BY
Lisa Carioto, DVM, DVSc, Diplomate ACVIM

HOSPITAL NAME
Noah's Ark Veterinary

REFERRING VET
Dr. Holstein

INVOICE
31218

PRESENTING CLINICAL SIGNS

Routine pre-surgical blood/urine testing for mass removal->ALP 2,320; 11/21 the ALP was 2,089 – cannot locate discussion about last year's result; also: U/A- usg 1.012, 2+protein, upc 1.2; 11/21 usg 1.043; upc 0.3.
Current Medications: Simparica monthly; no other medications noted.
Date of Previous IntraPet Ultrasound: No previous.
Sedation: Not required to complete full diagnostic ultrasound.
Stat Report: Not requested.
Imaging Performed By: Rachel Brilhart, RDMS.

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

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.

Kidneys

The **left** kidney measures 6.49 cm. The capsule is smooth. The cortex is mildly hyperechoic, i.e., it is isoechoic to the spleen. A hyperechoic rim band is observed along the medulla, traversing parallel to the corticomedullary junction, which accentuates the definition of the cortico-medullary junction in certain views. The calyces also appear mildly hyperechoic. Very mild mineralization of the diverticulae is noted, without evidence of nephroliths or pyelectasia. Blood flow is within normal limits. The surrounding mesentery is not hyperechoic.

The **right** kidney measures 5.81 cm. The capsule is smooth. The cortex is mildly hyperechoic. A mild loss of the normal definition of the cortico-medullary junction is present. The hyperechoic rim band along the medulla, traversing parallel to the corticomedullary junction is not as prominent compared to the left kidney. Minimal mineralization of the diverticulae and pelvis is noted, without evidence of nephroliths or pyelectasia. Blood flow is within normal limits. The surrounding mesentery is not hyperechoic.

Aortic bifurcation/trifurcation

No abnormalities observed.

Adrenal Glands

The **left** adrenal gland measures 0.84 cm at the cranial pole, 0.79 cm at the caudal pole and 2.94 cm in length. No abnormalities are noted with the gland's overall architecture, echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

The **right** adrenal gland measures 0.89 cm at the cranial pole, 0.71 cm at the caudal pole and 2.46 cm in length. 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. Subjectively, the spleen has a mildly heterogeneous or granular echotexture. Perivascular cuffing is observed, which is consistent with myelolipomas. The latter are not considered clinically significant. No abnormalities are observed with its vasculature, i.e. congestion and thrombi are not identified.

Liver

Although there are no obvious signs of hepatomegaly, the liver appears mildly "swollen". The liver's borders are smooth, but rounded. A diffuse, mildly heterogeneous echotexture is observed. It has a coarse or "granular" appearance throughout and is hyperechoic, i.e., it is isoechoic to the falciform fat. Focal lesions are not observed. No obvious abnormalities are noted with the hepatic vessels.

The gallbladder wall is within normal limits in thickness and echogenicity. A very small amount of echogenic material is present within the GB. There is no evidence of dilation or tortuosity of the portion of the cystic duct visualized. The common bile duct is not visualized due to gas in the surrounding gastrointestinal tract.

Gastrointestinal

A large amount of ingesta and gas are 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, despite the ingesta and gas.

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. Formed stools are present in the colon.

Pancreas

The pancreas is mildly heterogeneous, but has smooth contours. It consists of hypoechoic nodules of variable size, multiple hyperechoic foci, as well as perivascular cuffing. There is no evidence of hyperechogenicity of the surrounding mesentery. Signs of active pancreatitis are not present.

Other

Lymph nodes

No abnormalities are observed

Abdominal effusion is not visualized.

ULTRASONOGRAPHIC FINDINGS

- **Liver**: A vacuolar hepatopathy may explain the mild hyperechogenicity, however, the heterogeneity appears more severe than one would expect with a reactive hepatopathy. Differential diagnoses include chronic hepatitis, which may be primary (immune-mediated) or secondary in origin.
    - Further evaluation of Zelda's history regarding travel history and possible exposure to infectious agents, such as parasites, viruses, and bacteria is strongly recommended. Emphasis on vector borne organisms and leptospirosis is suggested, particularly due to her renal changes. Other causes, such as possible toxin exposure and medications, such as non-steroidal anti-inflammatories, and *natural supplements*, should be investigated.
    - Labrador retrievers are predisposed to copper hepatopathy, which may be exacerbated due to diet; evaluation of her diet is recommended.
    - Cholangitis/cholangiohepatitis and cholestasis cannot be excluded.

- There are no obvious signs of neoplasia

- **Gallbladder**: Gallbladder sludge is often clinically insignificant, however, gastroesophageal reflux disease (GERD), can occur in some patients. 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. Signs of cholecystitis are not appreciated.

- **Kidneys**: Although the renal changes are mild and nonspecific, they must be correlated with Zelda's isosthenuria and proteinuria. Glomerulonephritis or interstitial nephritis is possible. Pyelonephritis cannot be excluded despite the absence of classical sonographic changes.

- **Adrenal glands**: Mild bilateral adrenomegaly may be due to adrenal hyperplasia secondary to chronic illness and chronic stress. Occult (i.e., not yet clinical) pituitary dependent hyperadrenocorticism (HAC) is another differential diagnosis. There are no obvious signs of neoplasia.

- **Spleen**: The very subtle, but diffuse, miliary echotexture may be due to *extramedullary hematopoiesis*, *reactive hyperplasia*, or *mild splenitis*, *all of which are benign reactive processes*. However a "sensitive" ultrasound machine can "pick up" details that may not normally be seen and overinterpretation may occur. Therefore, interpretation of the spleen must take into account the sonographer's personal experience with their machine. The possibility of a mast cell tumour cannot be ignored based on the presence of a mass, which I am assuming is cutaneous or subcutaneous (not specified in the history). In conclusion, *a fine needle aspirate (FNA) of the spleen is warranted if there is any doubt* that Zelda's spleen is "more miliary or heterogeneous" compared to other "normal spleens".

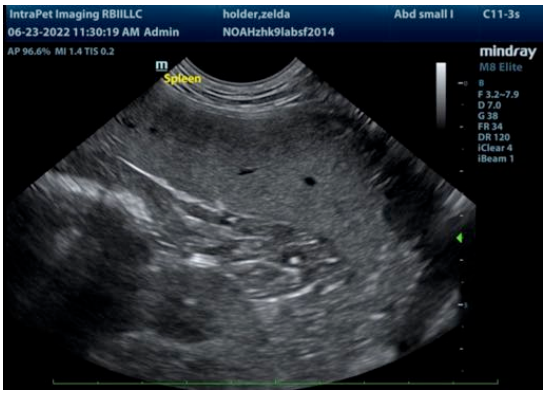
- **Pancreas**: The heterogeneity may be due to nodular hyperplasia or regeneration, as well as fibrosis, possibly due to previous episodes of pancreatitis and/or age related changes. Signs of active pancreatitis or neoplasia.

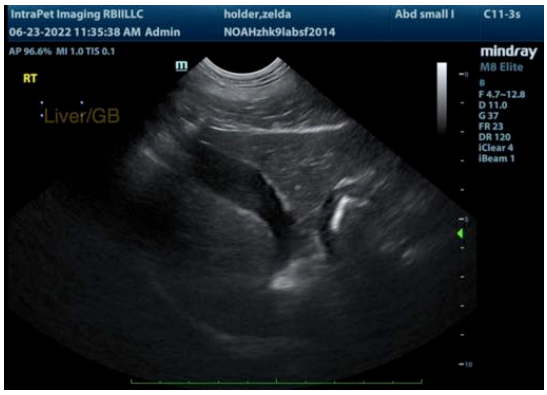
INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

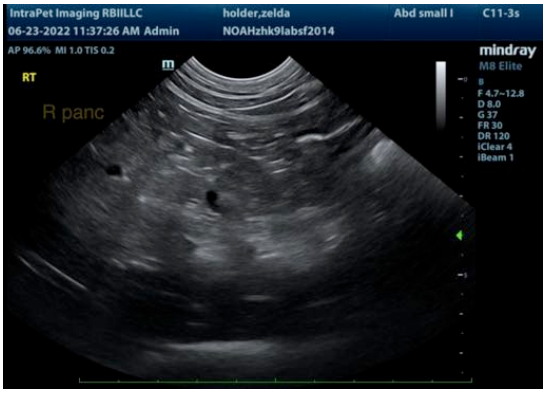
The following are suggested suggested/recommended

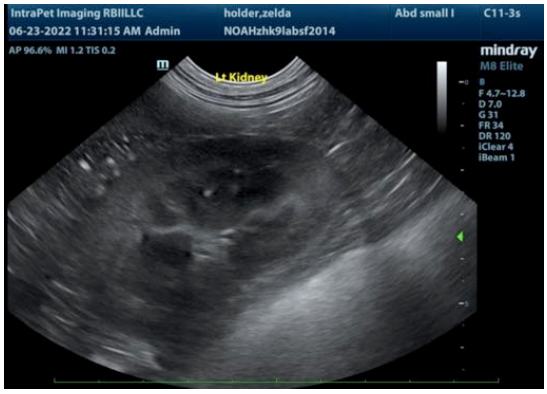
- GGT, if not already performed
- A urinalysis and urine culture and sensitivity to exclude pyelonephritis
- If urine culture and sensitivity negative, a urine protein: creatinine ratio
- Arterial blood pressure are recommended to rule out hypertension
- SNAP 4Dx, +/- PCR testing for other vector borne diseases depending on risk of exposure
- Exclude *Leptospira* spp. (PCR urine and serum, if no history or recent antibiotics, vs. serology)
- Evaluate diet, including treats (may need to call manufacturer to inquire about copper concentrations)
- Exclude medications and natural supplements
- Obtaining a history regarding signs of GERD from the client is suggested. Treatment with an anti-acid, proton pump inhibitor may be required depending on the history.
- Liver biopsy with copper quantification of tissue is required to diagnose copper hepatopathy, pending coagulation profile results.
- Vitamin K (0.5 mg/kg SQ q8-12h for 1-3 doses) is suggested, even if PT/PTT within normal limits.
- Further diagnostics for hyperadrenocorticism will depend on results of the above tests.
- Although not ideal, if hepatic biopsies cannot be performed or are not pursued, a veterinary hepatic diet may be administered, in addition to ursodeoxycholic acid (Ursodiol) with reassessment of liver enzymes, including GGT, 6 to 8 weeks after introduction of diet and medication. Do not introduce

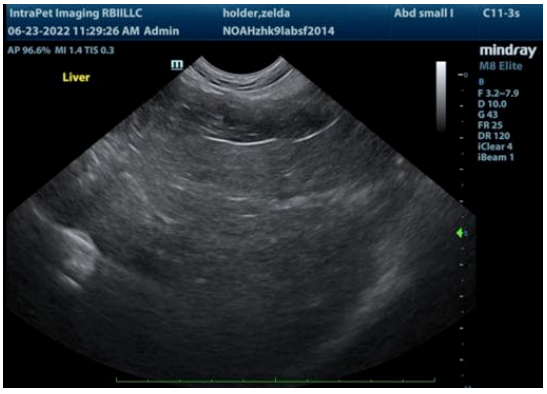
both at the same time (i.e. 2-3 week interval and gradually introduce Ursodiol to decrease GI side effects).

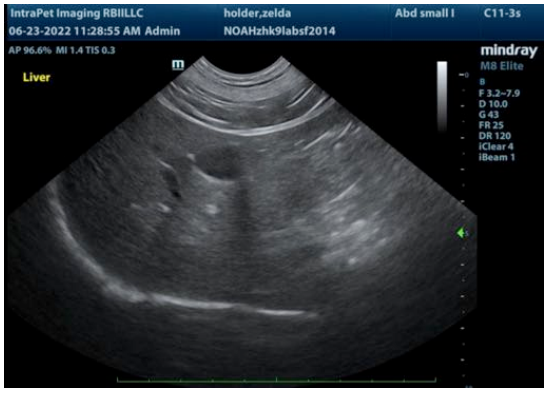


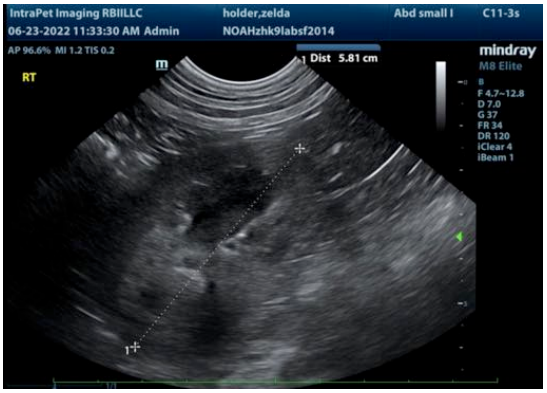








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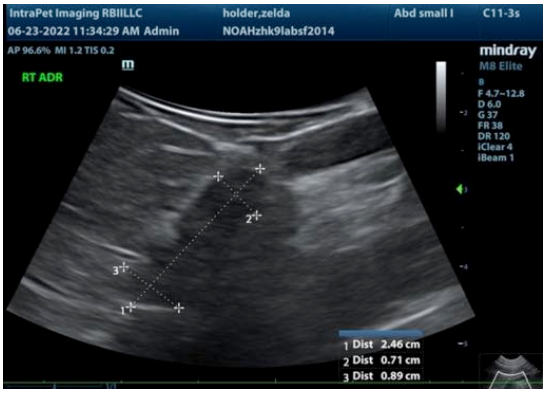
Dist 5.81 cm
RT
mindray
M8 Elite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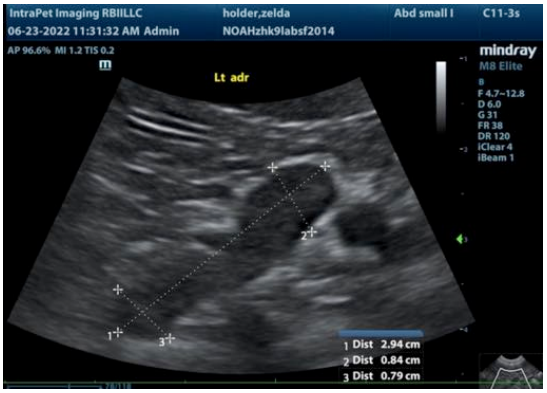
RT ADR
1 Dist 2.46 cm
2 Dist 0.71 cm
3 Dist 0.89 cm
mindray
M8 Elite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Lt adr
1 Dist 2.94 cm
2 Dist 0.84 cm
3 Dist 0.79 cm
mindray
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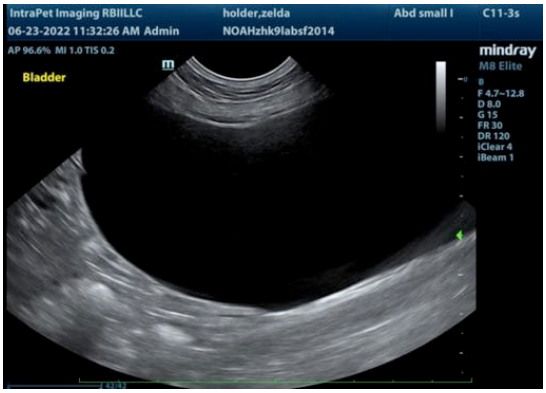
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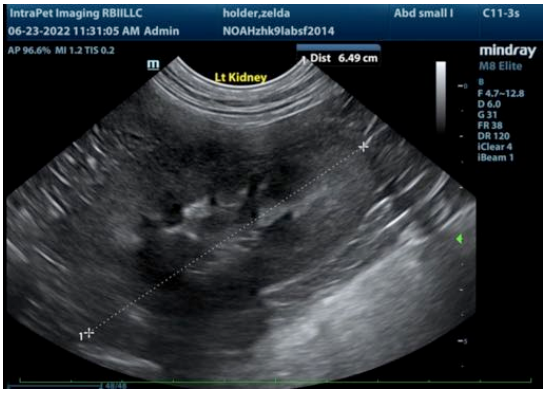
Bladder
mindray
M8 Elite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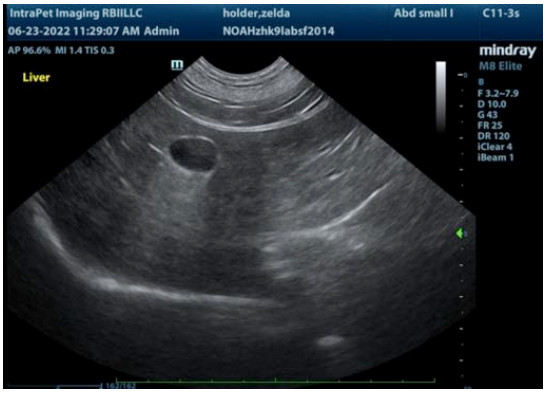
Dist 6.49 cm
Lt Kidney
mindray
M8 Elite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Liver
mindray
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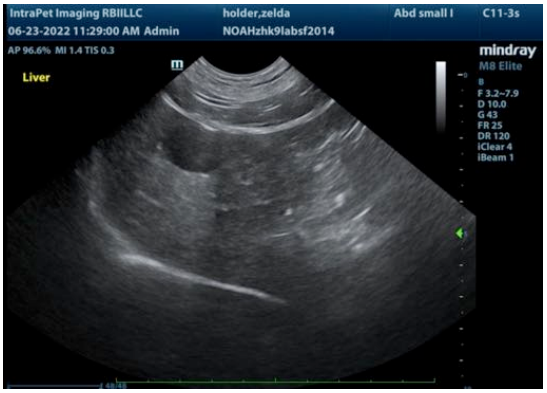

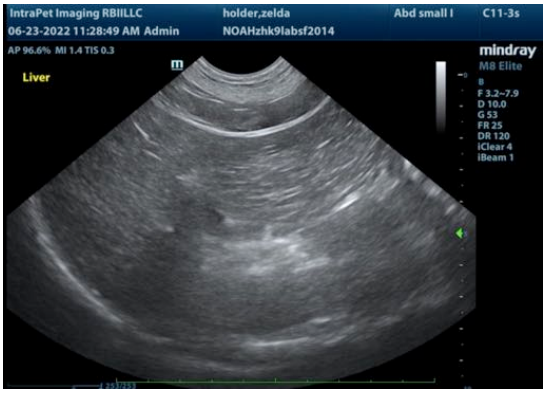

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Lisa Carioto, DVM, DVSc, Diplomate ACVIM
Lisa.Carioto@sonopath.com