

**DATE PRESENTING CLINICAL SIGNS**

4/7/22 Persistent liver enzyme elevation.

PATIENT Current Medications: Denamarin.

Buddy Novak

Lab Results: Nov 2021- ALT 127 (10-125), ALKP 1852 (23-212). Feb 2022- ALT 130, ALKP 1718.

Date of Previous IntraPet Ultrasound: No previous.

Sedation: Not required to complete full diagnostic ultrasound.

Stat Report: Not requested.

SPECIES

Canine

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN**BREED** *Urinary System*

Dalmatian

The urinary bladder is moderately distended with anechoic urine. The Bladder wall, trigone, ureteral papillae and visible urethra (to a depth of 2cm) appear normal with no evidence of wall thickening, mucosal irregularities, or masses. There is a small amount of shadowing, hyperechoic debris in the dependent portion of the urinary bladder, most consistent with sandy mineralized material. Recommend urinalysis and culture.

SEX

Neutered Male

The visualized areas of prostate and surrounding tissue appear normal. Unfortunately, the prostate is not fully visualized likely due to its intrapelvic location. Correlate with rectal exam findings.

AGE

10/12/11

The left kidney has a normal shape and size (7.31 cm) with a large cortical cyst measuring 1.4 cm x 1.25 cm. Overall echogenicity is slightly hyperechoic with poor corticomedullary distinction and a typical 1:3 cortex:medulla ratio. There is no evidence of perinephric inflammation or effusion. There is no evidence of pyelectasia, nephroliths, infarcts or hydroureter. Renal vasculature is normal.

WEIGHT

78 Pounds

The right kidney has a normal shape and size (7.5 cm). Overall echogenicity is slightly hyperechoic with poor corticomedullary distinction and a typical 1:3 cortex:medulla ratio. There is no evidence of perinephric inflammation or effusion. There is no evidence of pyelectasia, nephroliths, infarcts or hydroureter. Renal vasculature is normal.

INTERPRETED BY

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IMAGING PERFORMED BY

Andi Parkinson RDMS

Adrenal Glands

The left adrenal gland is normal/borderline large in size measuring 0.51 cm at the cranial pole, 0.91 cm at the caudal pole, and 2.4 cm in length. It is observed in its normal position cranial to the left renal artery. It is somewhat irregular in appearance in that the caudal pole appears rounded and approximately twice the size of the cranial pole. It is iso- to hypoechoic compared to the cranial pole, and there is no evidence of any vascular irregularities.

HOSPITAL NAME

Banfield White Marsh

The right adrenal gland is normal in size measuring 0.87 cm at the caudal pole. It is observed in its normal position between the cranial aspect of the right kidney and the caudal vena cava. It is normal in appearance (uniformly hypoechoic) and shape with no evidence of a mass effect.

REFERRING VET

Dr. Gutwillig

Spleen

The spleen is subjectively normal in size, echotexture is homogenous, and the splenic capsule is smooth with no irregularities. The blood flow through the hilus and splenic parenchyma appears normal. No focal parenchymal abnormalities are visualized.

INVOICE

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Liver

The liver is large in size, and normal in echogenicity with irregular margins. The parenchyma is severely heterogenous in echotexture with subtle, indistinct focal mottling. The visible portions of the vasculature and biliary tract appear normal. There are numerous ill-defined, hypoechoic nodules scattered throughout the parenchyma. These vary in size from 0.5-2.0 cm.

The gallbladder lumen is moderately distended. The wall of the gall bladder is not thickened and has a smooth mucosal surface. Luminal contents are primarily anechoic. The cystic and common bile ducts are normal/not visible.

Gastrointestinal

The stomach contains minimal luminal contents. It measures at a normal thickness of <0.7cm with some variability due to the presence of rugal folds. The distinction of the gastric wall layers is adequate and there is no impression of reduced peristaltic activity. No masses or focal lesions were observed.

The visualized areas of duodenum, jejunum and ileum have a relatively uniform diameter with minimal fluid distension. Wall thickness is normal. Bowel loops follow a curvilinear path with distinct wall layering maintaining the typical 1:3 muscularis:mucosa layer ratio. The duodenum measured as normal (between 0.3-0.5cm in wall thickness) and the jejunum measured as normal (between 0.2-0.47cm.) Visualized peristalsis appears appropriate. There were no focal lesions consistent with obstruction or a mass effect observed.

The ileocecal junction was visualized and exhibited normal intact wall layering and is subjectively of normal thickness. Sections of colon are visualized with formed fecal material and gas shadowing distally. There is no observed focal or generalized colon wall thickening or loss of layering.

Pancreas

The pancreas is normal and isoechoic to surrounding mesentery. There is no evidence of nodules or cystic lesions. There is no evidence of regional mesenteric inflammation or fluid.

Free Abdomen

Evaluation of the peritoneal cavity did not reveal any evidence of effusion, or subjective lymphadenomegaly. The Medial iliac nodes appear normal and there was no evidence of a caudal aortic thrombus at the bifurcation. The omentum is of normal uniform echogenicity.

Other

There is a hypoechoic cystic structure visualized within the abdomen. This cystic structure does not appear directly related to any other abdominal structures, and is most likely a benign omental cyst, measuring approximately 1.7 cm x 2.0 cm.

PRIMARY FINDINGS

- Mineralized debris within the dependent portion of the urinary bladder – Correlate findings with abdominal radiographs, urinalysis and culture. As this is a Dalmatian, monitor for urate crystals.
- Rounded, enlarged caudal pole of the left adrenal gland – most consistent with an adrenal nodule. Possible differentials include hyperplasia, adenoma, carcinoma, pheochromocytoma, incidentaloma, etc.
- Large, irregular, heterogeneous liver with numerous ill-defined, hypoechoic nodules – The diffuse hepatic changes are non-specific and could be consistent with vacuolar hepatopathy, nodular hyperplasia, inflammatory/immune-mediated disease, fibrosis, extramedullary hematopoiesis, toxic hepatopathy (e.g., copper), infiltrative neoplasia (less likely) or other hepatopathy.

SECONDARY FINDINGS

- Decreased corticomedullary distinction in both kidneys and a left-sided cortical cyst – The bilateral renal findings are consistent with age-related change.
- Cystic omental structure – likely an incidental finding, but continued monitoring is warranted.

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

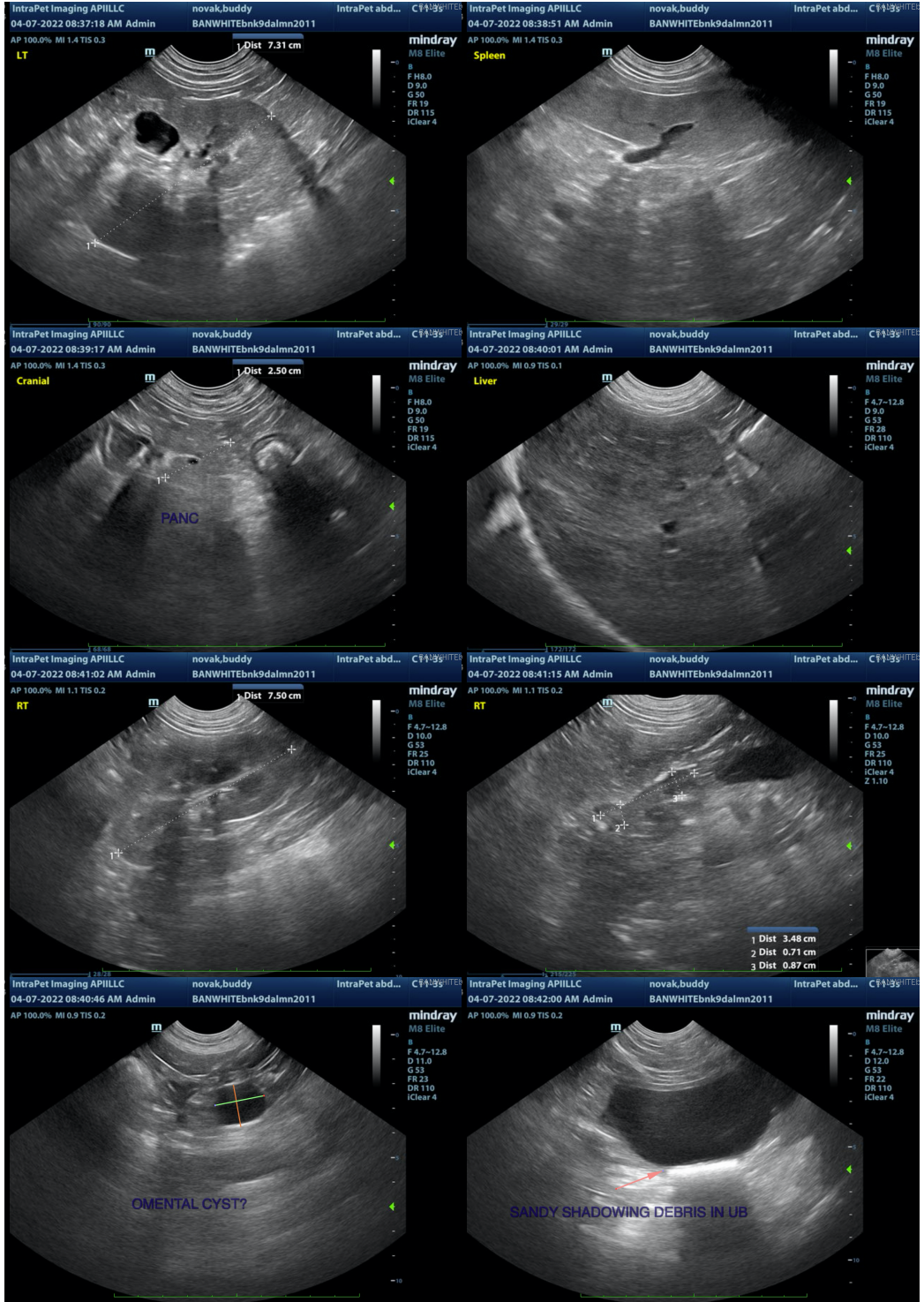
The liver changes are significant. These changes could be associated with an inflammatory process, regenerative nodules, infiltrative neoplasia (less likely), etc. Consider these recommendations:

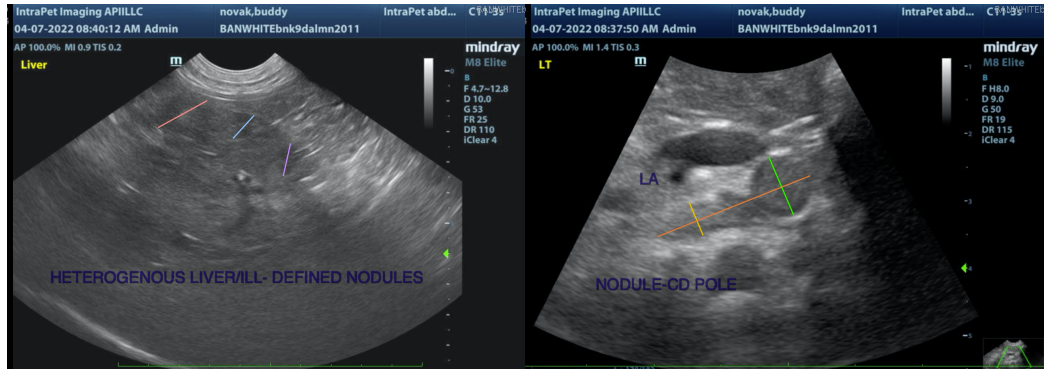
- Consider close evaluation of history for possible toxic changes examine medications, diet, dietary indiscretion etc...
- Consider PCR on urine/serum for leptospirosis (if not on antibiotics)/serology if recent antibiotic history
- If not already done, consider pre and post prandial bile acids to evaluate liver function
- If the ALP is significantly elevated relative to the ALT and symptoms consistent with cushings are present, consider adrenal function testing (ACTH stim)
- Consider Fine needle aspirate if round cell neoplasia is on your differential list (25 g needle, normal coags)
- If no response to medical care (Denamarin +/- ursodiol etc...) Consider liver biopsy with samples obtained for histopathology, culture, and copper levels.

A small nodule is visualized on the caudal pole of the left adrenal gland. This is not significantly enlarged, but is asymmetrical compared to the cranial pole. This is nodule is relatively small and is not deforming the adrenal gland significantly, and doesn't appear to have any evidence of vascular invasion. These nodules can be benign or malignant and can secrete hormones or be non-active. Options moving forward include:

- If signs of cushings are present, consider adrenal function testing. I prefer an ACTH stimulation test combined with an adrenal panel to the University of Tennessee's endocrine lab to look for atypical adrenal hormones as well as cortisol. (other testing can suffice)
- If adrenal dependent cushings is suspected and supported by adrenal function testing consider medical therapy with lysodren or trilostane or consider surgical removal (recommend referral to a board certified veterinary surgeon and possible pre op CT)
- Recommend blood pressure evaluation-if hypertensive consider testing catecholamine levels for a possible pheochromocytoma
- If no symptoms of cushings are present, consider either referral for surgery or continued monitoring with ultrasound (in 3-4 months).
- Many of these nodules can be benign and incidental in nature, unfortunately that is difficult to determine with a single ultrasound.

There is a small amount of mineralized dependent debris in the urinary bladder. Given this pet's breed, recommend radiographs to see if this can be visualized. Urinalysis and culture recommended.





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.

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