

**DATE PRESENTING CLINICAL SIGNS**

3/15/22 Presented for v/d and decreased appetite. Hepatomegaly on rads, severely elevated liver enzymes. O's declined hospitalization. P started on oral meds.

PATIENT

Snickers Onorato Current Medications: 3/11- Cerenia 24mg SID, Amoxi 250mg BID, Metro 125mg BID, Denamarin Advanced SID.

Lab Results: CBC unremarkable. Chem: ALKP 2649, ALT >3000, GGT 29, Chol 327.

Date of Previous IntraPet Ultrasound: No previous.

SPECIES

Sedation: Not required to complete full diagnostic ultrasound.

Canine

Stat Report: Not requested.

BREED

Pug

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN**Urinary System**

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, masses or cystic calculi.

SEX

Spayed Female

The left kidney has a normal shape and size (4.77 cm). Overall echogenicity is normal with adequate 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.

AGE

1/19/10

The right kidney has a normal shape and size (4.26 cm). Overall echogenicity is normal with adequate 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

21.5 Pounds

INTERPRETED BY

Kathleen Sennello DVM,
MS, Diplomate ACVIM
(Small Animal Internal
Medicine)

Adrenal Glands

The left adrenal gland is large in size measuring 0.45 cm at the cranial pole, 1.26 cm at the caudal pole, and 2.17 cm in length. It is observed in its normal position cranial to the left renal artery. It is abnormal in appearance in that the caudal pole is enlarged and isoechoic to the remaining portion of the left adrenal gland. Findings are suggestive of a nodule in the caudal pole of the left adrenal gland.

IMAGING PERFORMED BY

Rachel Brilhart RDMS

The right adrenal gland is large in size measuring 1.45 cm at the cranial pole, 0.49 cm at the caudal pole, and 2.87 cm in length. It is observed in its normal position craniomedial to the right kidney and the caudal vena cava. It is somewhat abnormal in appearance in that the cranial pole is much larger than the caudal pole. Findings could be consistent with normal anatomic variation or a nodule in the cranial pole of the adrenal gland.

HOSPITAL NAME

Hickory Vet Hospital

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.

REFERRING VET

Dr. Lyle

Liver

The liver is subjectively normal in size, and echogenicity with smooth peripheral margins. The parenchyma is heterogenous in echotexture with subtle, indistinct focal mottling. The visible portions of the vasculature and biliary tract appear normal. No focal nodules or cystic lesions are observed.

INVOICE

36189

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 uniform diameter with minimal fluid distension. Wall appears subjectively, mildly increased. Bowel loops follow a typical curvilinear path with distinct wall layering. Duodenum wall measured 0.51 cm. Jejunum wall measured 0.31 cm. 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.

ULTRASONOGRAPHIC FINDINGS

- Enlarged abnormal adrenal glands – The appearance of the adrenal glands is abnormal in that there is an enlargement in the caudal pole of the left adrenal and in the cranial pole of the right adrenal. This could be consistent with anatomic variation, an atypical form of adrenal hyperplasia, or bilateral adrenal nodules.
- Heterogeneous liver – 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.
- Mild subjective small intestinal thickening – The mild small intestinal wall changes may be a normal variant in this patient or could be consistent with an inflammatory process (e.g., inflammatory bowel disease).

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

No focal lesions are observed associated with the liver, and the gallbladder appears relatively normal. Unfortunately, the sonographic changes do not always reflect the severity or cause of the hepatopathy.

- 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 supportive care (denamarin, fluids, antibiotics,+/- ursodiol etc...) Consider liver biopsy with samples obtained for histopathology, culture, and copper levels.

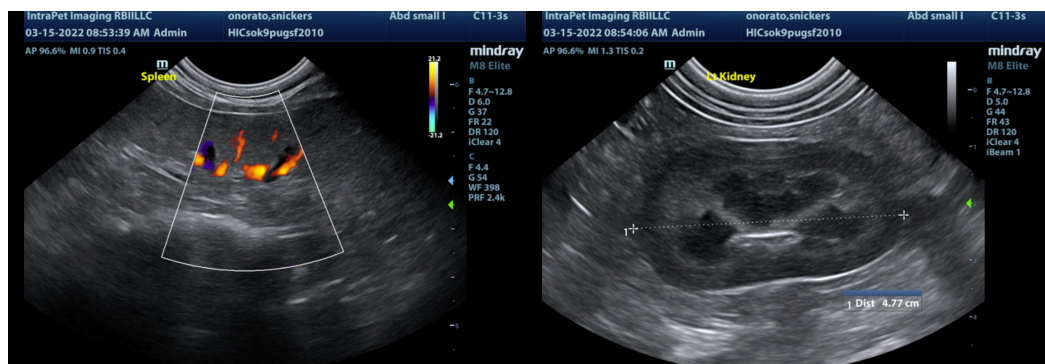
Additionally, the adrenal glands appear somewhat abnormal. The caudal pole of the left adrenal is enlarged, and the cranial pole of the right adrenal gland is enlarged. Neither lesion appears irregular, and there is no evidence of vascular invasion. It would be somewhat abnormal for a pet with adrenal disease to have symptoms of vomiting and diarrhea, so I suspect this is an incidental but possibly important finding, likely not related to what is currently going on.

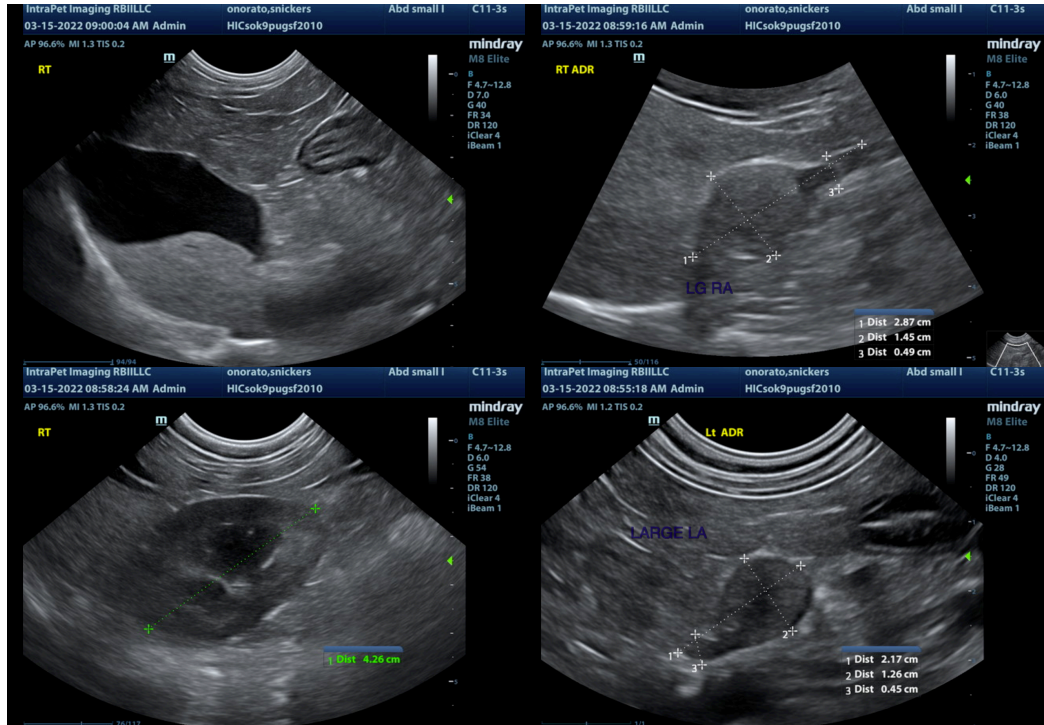
Options moving forward regarding the adrenal glands include:

- 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) **I do not recommend adrenal function testing when the patient is not feeling well, as this can alter results and make them difficult to interpret.
- 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 advanced imaging to better evaluate the adrenal glands, or recheck ultrasound in approximately 2 months.
- Many of these nodules can be benign and incidental in nature, unfortunately that is difficult to determine with a single ultrasound.

Unfortunately, at this time it is difficult to determine the nature of these lesions. These could represent benign incidental findings, or could be more important and be early neoplastic lesions.

Consider three view thoracic radiographs to rule out concurrent thoracic disease/involvement.





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.

Kathleen Sennello DVM,MS, Diplomate ACVIM (Small animal Internal Medicine)
 kathleen.sennello@sonopath.com