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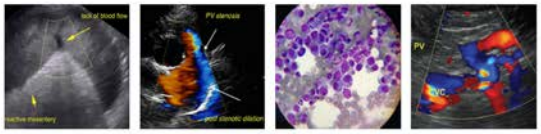

SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
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PATIENT

Maggie Williams

SPECIES

Canine

BREED

ACD Mix

SEX

FS

AGE

10 years

WEIGHT

32 Pounds

INTERPRETED BY

R. McKenzie Daniel, DVM, DABVP (Canine and Feline)

IMAGING PERFORMED BY

Rebekah Jakum, CVT ARDMS/RVT

HOSPITAL NAME

Pocono Peak VC

REFERRING VET

Dr.

INVOICE

26329

DATE

10.15.2021

PRESENTING CLINICAL SIGNS

History: PU/PD, lethargy

ALP 700, ALT 232, GGT 45, TBili 0.2, USG 1.005, unremarkable CBC.

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The urinary bladder presented uniformly thickened urinary bladder wall isoechoic to the adjacent normal urinary bladder wall. Apical urinary bladder wall measured 0.66 cm in width. The luminal margin of the thickened urinary bladder wall was mildly asymmetrical in contour. Mineralization or echogenic foci within the thickened areas of urinary bladder wall was not present. The urethra was normal to a depth of 3.0 cm.

Normal size and margination were present in the kidneys. A normal 1:3 cortex / medulla ratio was maintained. The medulla and cortices were uniform in texture with some increased echogenicity and loss of corticomedullary symmetry and definition expected for the age of the patient. No evidence of pelvic dilation was present. The left kidney measured 5.7 cm. The right kidney measured 5.7 cm.

Adrenal Glands

Both adrenal glands exhibited generalized enlargement with non-homogeneous yet non-mineralized parenchyma. The left adrenal gland measured 3.8 cm length x 2.0 cm at the cranial pole and 1.64 cm at the caudal pole. The right adrenal gland measured 3.3 cm length x 1.0 cm at the cranial pole and 1.23 cm at the caudal pole.

Spleen

The spleen exhibited primarily finely textured and homogenous parenchyma which was hyperechoic to the liver and renal cortical parenchyma. Intermittent, variably sized, echogenic nodules were present throughout the cranial to caudal parenchyma. A caudal echogenic nodule exhibiting distal acoustic shadowing exhibited mild expansion with subtle distortion of the lateral splenic capsule This nodule measured 2.0 cm diameter. The splenic vasculature at the hilus was normal in volume with no evidence of congestion or thrombosis. Acute to chronic inflammatory or neoplastic changes were not noted. The echogenic nodules tend to trend benign and are most consistent with benign hyperplasia or myelolipomas.

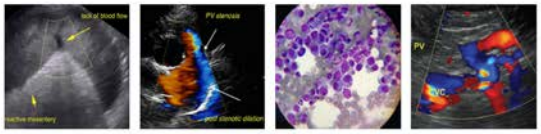
Liver

The liver presented enlarged in size. The parenchyma of the liver was subjectively normal in echogenicity compared to the spleen and renal cortices. The liver parenchyma was uniform with a mildly coarse echotexture. Intermittent, non-expansive, uniformly echogenic parenchymal nodules were noted. The capsule of the liver was symmetrically rounded to mildly swollen in margination. The hepatic and portal vasculature were normal in appearance without signs of congestion. The gallbladder was non distended in size with mild, echogenic, nonmineralized biliary sludge. The cystic duct and common bile ducts were normal without evidence of dilation.

Gastrointestinal

The stomach presented intact wall layering with a normal wall layer ratio. The lumen of the stomach was empty with no signs of ileus, obstruction or foreign material.

The small intestine presented intact wall layering with 1:3 muscularis/mucosa ratio. The lumen of the small intestine was empty with no signs of ileus, obstruction or foreign material.



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Normal visible colon wall layers were present with apparent formed feces in lumen.

Pancreas

The parenchyma of the left limb, body and right limb of the pancreas presented isoechoic to the adjacent omental fat. A normal curvilinear capsule contour of the pancreas was present. The visible pancreatic duct was normal. No signs of active inflammation or neoplastic disease was evident.

ULTRASONOGRAPHIC FINDINGS

- Bilateral adrenomegaly with non-homogeneous, yet non-mineralized parenchyma
- Hepatomegaly with intermittent, likely benign nodules – nodules suggestive of probable lipogranulomas or nodular hyperplasia.
- Mild gallbladder debris
- Mild chronic renal changes
- Intermittent expansive to non-expansive hyperechoic splenic nodules – likely benign, myelolipomas, hyperplasia, or emerging mineralization seen with underlying endocrinopathy possible.

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Full adrenal workup with LDDST indicated. Screening blood pressure recommended. The bilateral adrenal glands may indicate hyperplasia as with underlying hyperadrenocorticism, adenomatous change, while the possibility of neoplasia associated with either the left, right or bilateral adrenal glands cannot be excluded. Urine culture and sensitivity on sterile urine sample recommended.

Efficient & Accurate Cushing's Work up

Notes regarding Cushing's Clinical Presentations:

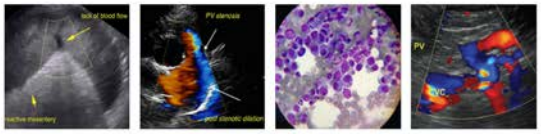
Nearly all Cushing's dogs have SAP elevations and true PU/PD (USG < 1.025) and most are polyphagic. Cushing's dogs are > 6 years and usually > 9 years old, usually have poor skin coats, body scores > 3/5, and are usually sedentary animals.
Its important to remember that Cushing's dogs usually look and play the part and other diseases cause false + stress related cortisol spikes. On rare occasion a Cushing's dog will not follow the rules but this is truly an exception.
Potential Cushing's patient workups can be costly and frustrating if not definitive and, in my experience, the non-definitive patient usually has something else going on that may be contributing to some of the clinical signs a Cushing's dog will have, especially SAP elevations or PU/PD. Based on this prelude of information I came up with the following algorithm in the spirit of diagnostic efficiency.
The following suggested protocol is based on current available literature on Cushing's disease and extensive clinical-sonographic experience evaluation + Cushing's and False + LDDST & ACTH stim. cases in order to maximize the efficiency of a Cushing's workup in practice.

Screen first, workup second

1) **UA:** Repeatable (2-3 urine samples) Urine specific gravity & urine cortisol/creatinine ratio (UCCR): If ***repeatable USG< 10.20 and + UCCR*** move to next step 2.

Note: UA is inexpensive and easy to obtain and if UA criteria is not met for Cushing's then resources can be spent into other more pertinent diagnostics or left on hold until the UA criteria is met in emerging Cushing's cases.

2) **Sonogram:** Does the patient **have concurrent disease** clinically or sonographically as non-Cushing's illness will influence the potential false + LDDST or even ACTH stim. The sonogram gives a global perspective of the internal health of the patient to be considered in the Cushing's workup as an



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assessment of concurrent disease. Is there a concurrent neoplastic process, UTI pancreatitis, mucocele….? Are the adrenals enlarged (Cushing's-PDH, stress, age related or breed variant), or atrophied (Iatrogenic Cushing's or adrenal burnout), have asymmetric enlargement (Adrenal tumor, hyperplasia, adenoma, age related variant), or is there vascular invasion (Invasive pheo with false + UA criteria or adenocarcinoma or phrenic thrombosis)? The sonogram answers these questions proactively.

3) **LDDST** (0.01 D-Sodium phosphate mg/kg IV) (Better screening test but plagued with false +) Use if there is potential early Cushing's or if adrenal asymmetry present on sonogram suspecting tumor. Use LDDST in cats at a higher dose (0.1 mg/kg IV).

OR

4) **ACTH stim**. (Better confirming test but can have false +) Use if the patient "looks" Cushingoid or if bilateral adrenal enlargement is present, or high normal width on sonogram, or if iatrogenic Cushing's suspected (Cortisone Tx in past).

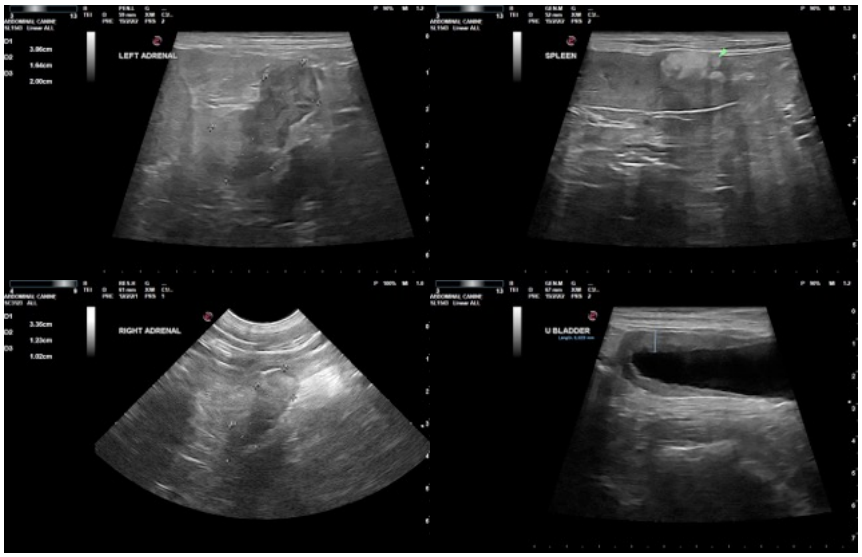
5) If **diabetic** then run both LDDST & ACTH stim.

5) Run a **serial blood pressure** in a BP friendly non "white coat effect" atmosphere. Run at least 3 at different times over a few hours or when eating as the patient tends to be calm when eating or give Torbutrol when entering the facility.

6) **Perform CT** of the pituitary to identify macro adenoma expansion if any lethargy or dullness or other central clinical CNS signs are minimally present.

Suggested reading:

Behrend EN, Kooistra HS, Nelson R, et al. Diagnosis of Spontaneous Canine Hyperadrenocorticism: 2012 ACVIM Consensus Statement (Small Animal). J Vet Intern Med 2013;27:1292–1304 .



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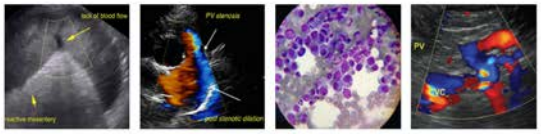

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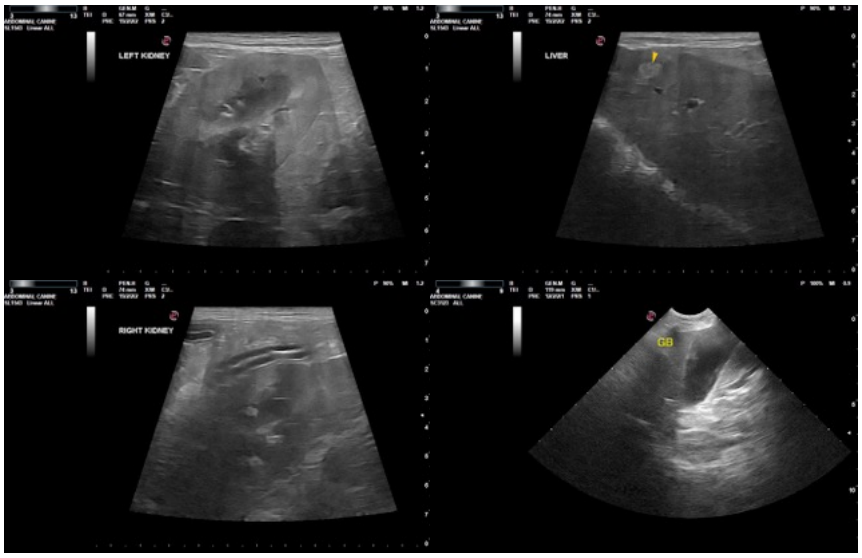

The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

R. McKenzie Daniel, DVM, DABVP (Canine/Feline Practice)
mac.daniel@sonopath.com