



PATIENT

Teddy Nichols

PRESENTING CLINICAL SIGNS

Screening for enlarged adrenal glands, hepatomegaly due to unequivocal LDDST, chronically elevated Alk Phos and pu/pd

SPECIES

Canine

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The urinary bladder, trigone, and pelvic urethra presented normal thicknesses and normal tone to a depth of 1 cm. The ureters were not visible which is normal. No uroliths or sediment were visualized, and anechoic urine was present. No evidence of inflammatory or neoplastic changes were noted. Ureteral papillae were normal.

BREED

Spaniel Mix

SEX

FS

The kidneys revealed normal size and structure, corticomedullary definition and ratio for this age. The cortices presented largely uniform texture with normal echogenic relationship to liver and spleen. Medullary structure differed distinctly from the cortex and no evidence of pelvic dilation was present. The capsules were acceptably uniform without significant irregularities. The left kidney measured 5.08 cm in length. The right kidney measured 5.02 cm in length.

AGE

10yr

Adrenal Glands

The bilateral adrenal glands were uniformly enlarged. The left adrenal gland measured 1.02 cm maximum width. The right adrenal gland measured 1.0 cm maximum width.

WEIGHT

35.4

Spleen

The spleen presented a smooth homogeneous parenchyma hyperechoic to liver and renal cortical parenchyma. The capsule was smooth without noticeable expansion or deviation from within the spleen or adjacent pathology. The splenic vasculature demonstrated normal volume without signs of congestion or thrombosis. No sonographic evidence of acute or chronic inflammatory, neoplastic, or infarctual changes were noted.

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

Liver

The liver images from right and left intercostal as well as subcostal views revealed subjectively normal liver size, contour, and structure. Some mild age-related parenchymal remodeling was noted but likely not clinically significant at this time. Vascular and biliary tracts were of normal volume and no evidence of congestion was noted. The gallbladder presented some dependent sludge with essentially normal contour. The cystic and common bile ducts were normal. No overt evidence of active inflammatory, infiltrative or regenerative pathology was noted but should be paired with current or past LE elevations regarding any clinical significance to this presentation. The hepatic lymph nodes were unremarkable.

IMAGING PERFORMED BY

A. Murphy CVT

HOSPITAL NAME

Wauwatosa Vet

Gastrointestinal

Examination of the gastrointestinal tract revealed a stomach and intestine free of stasis, of normal wall thickness, acceptable curvilinear mural detail, and peristaltic activity. Small and large intestine demonstrated normal luminal chyme and stool consistency respectively. No obstructive or overt infiltrative disease was noted. No associated abnormal lymphatic activity was noted.

REFERRING VET

Dr Ericka Haynes

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Pancreas

The base and limbs of the pancreas were observed to be largely isoechoic to surrounding omental fat. Pancreatic duct and capsular contour were acceptably normal, and parenchyma respected normal curvilinear patterns. No overt evidence of active inflammatory or neoplastic disease was noted.

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Free Abdomen

No omental masses, overt lymphadenopathy or peritoneal effusion was present.

SPECIES

Canine

ULTRASONOGRAPHIC FINDINGS

BREED

- Mild bilateral adrenal hypertrophy.

Spaniel Mix

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

SEX

If a clinical profile for Cushing's is complete with isosthenuria, elevated UCCR and LDDST results consistent with Cushing's syndrome then PDH is likely. BP measurements are indicated.

FS

Efficient & Accurate Cushing's Work up-Lindquist

AGE

Notes regarding Cushing's Clinical Presentations:

10yr

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.

WEIGHT

35.4

It's 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.

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

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.

IMAGING PERFORMED BY

A. Murphy CVT

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.

HOSPITAL NAME

Wauwatosa Vet

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.

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Dr Ericka Haynes

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.

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- 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 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,

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PATIENT	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.
Teddy Nichols	
SPECIES	Address & treat concurrent disease first before performing Cushing's testing or testing will be artificially altered increasing false negatives and positives.
Canine	3) LDDST (0.01 D-Sodium phosphate mg/kg IV with precise dosing****) (Better screening test but plagued with false + but considered more specific than ACTH stim) 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). Interpretation LDDST: Look at 8-hour post first: If > 1.4 = Cushing's. Then look at 4-hour: if > 1.4 or > 50% baseline = Cushing's. 4-hour do then 8-hour spike most consistent with PDH. Flat line high constant curve without dip more consistent with tumor but can be PDH. See attached graph.
BREED	
Spaniel Mix	
SEX	Courtesy: Rebecca Berg DACVIM, DECVIM
FS	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). ACTH stim is better for diagnosis of Addison's, iatrogenic Cushing's, and Cushing's therapy monitoring but problematic with initial Cushing's diagnosis. First dx LDDST is suggested.
AGE	
10yr	5) If diabetic then run both LDDST & ACTH stim but stabilize as much as possible first.
WEIGHT	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. Cushing's hypertension is usually 150-180 systolic range while pheochromocytoma range is more often > 180 systolic.
35.4	
INTERPRETED BY	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. CT for adrenal may be more thorough for adrenalectomy surgical planning if ultrasound views of the CVC were problematic.
Eric Lindquist, DMV DABVP, Cert. IVUSS	
IMAGING PERFORMED BY	7) Adrenalectomy for adrenal mass is prescribed then it is essential to stabilize the patient first regarding secondary disease such as organ dysfunction, hypertension, diabetes mellitus, hypernatremia, thromboembolic risk urinary and other infection in order to minimize potential for operative and postoperative complications as they are common in adrenalectomy. Trilostane stabilization therapy for Cushing's would be the first approach then address surgery and hypertension should be managed ideally < 160 systolic with ace inhibitors, phenoxybenzamine, or amlodipine.
A. Murphy CVT	
HOSPITAL NAME	Suggested reading:
Wauwatosa Vet	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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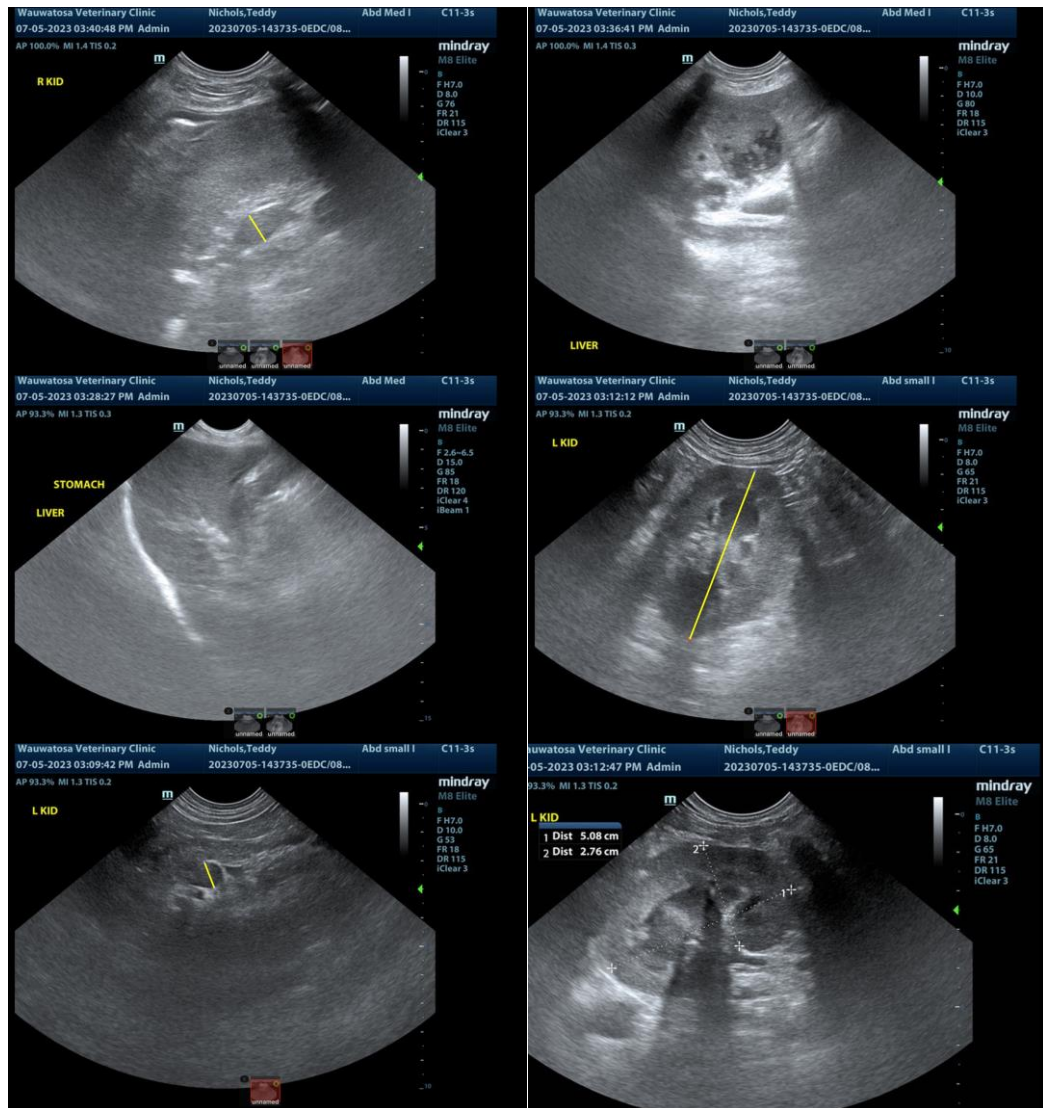
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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Eric Lindquist, DMV, DABVP, Cert. IVUSS, CEO of SonoPath.com
Eric.Lindquist@SonoPath.com