



PATIENT PRESENTING CLINICAL SIGNS

Mia Blum
History: 2 month history of PU/PD
Abnormal PE/Chem/CBC/UA Results: BW/UA revealed mild ALP increase(257) with a low USG(1.010) and a mild-moderate proteinuria confirmed via UPC ratio(0.8). Urine C&S revealed no growth.

SPECIES

Canine

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

BREED
Pitbull Mix
The urinary bladder, trigone, and pelvic urethra presented normal thicknesses and normal tone to a depth of 3 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.

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 6 cm in length. The right kidney measured 6 cm in length.

AGE

12 years

Adrenal Glands

WEIGHT
30 pounds
The left adrenal gland was mildly swollen at the caudal pole measuring 1.0 cm, the cranial pole appeared normal at 0.44 cm. The right adrenal gland exhibited minor uniform swelling with heterogeneous parenchymal changes measuring by 0.8 cm caudal pole width by 1.15 cm cranial pole width. No evidence of capsular escape of vascular invasion.

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

Spleen

The spleen presented a smooth homogeneous parenchyma hyperechoic to liver and renal cortical parenchyma with minor uniform enlargement. The capsule was smooth without noticeable expansion or deviation from within the spleen or adjacent pathology and was folded upon itself cranially. 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.

IMAGING PERFORMED BY
Michael Roppolo

Liver

Exam of the cranial abdomen demonstrated excessive liver size, swollen contour, with conserved uniform architecture. Parenchymal echogenicity was diffusely isoechoic to the spleen and falciform fat. Minor excessive GB debris was noted with the presence gall bladder dilation and precipitate without the overt formation of mucocele but this may be an issue in the future.

HOSPITAL NAME

Pennsauken Animal
Hospital and Urgent
Care

Gastrointestinal

REFERRING VET

Dr. Roppolo

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.

INVOICE

10510ag

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.

DATE

05/02/2022



PATIENT

Mia Blum

ULTRASONOGRAPHIC FINDINGS

SPECIES

Canine

- Benign hepatopathy-possibly endocrinopathy related
- Irregular and slightly enlarged left adrenal gland
- Uniformly enlarged right adrenal gland
- Unremarkable kidneys

BREED

Pitbull Mix

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

A workup for Cushing's disease is indicated if the patient appears Cushingoid.

SEX

FS

AGE

12 years

WEIGHT

30 pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Michael Roppolo

HOSPITAL NAME

Pennsauken Animal
Hospital and Urgent
Care

REFERRING VET

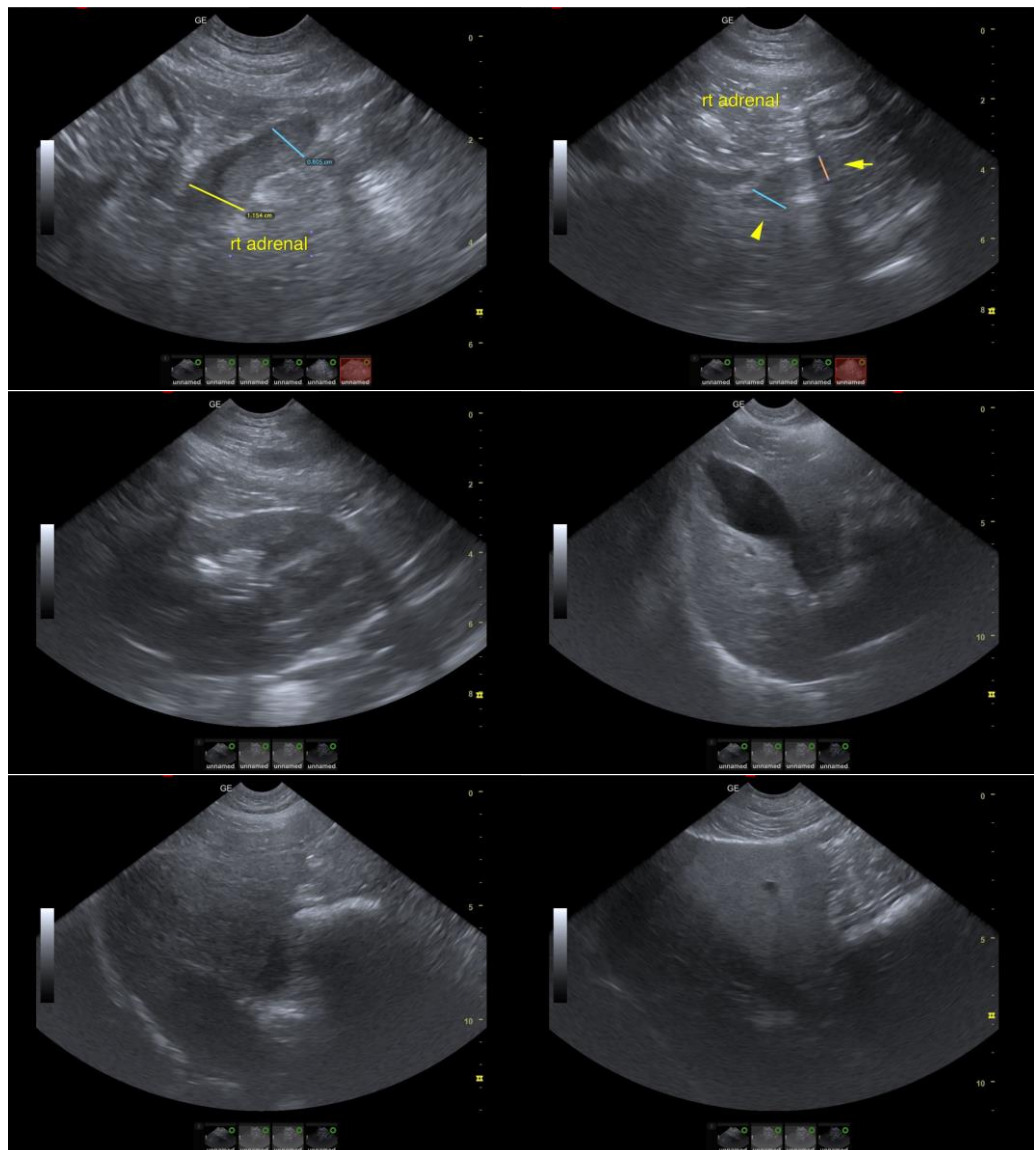
Dr. Roppolo

INVOICE

10510ag

DATE

05/02/2022





PATIENT

Mia Blum

SPECIES

Canine

BREED

Pitbull Mix

SEX

FS

AGE

12 years

WEIGHT

30 pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

**IMAGING
PERFORMED BY**

Michael Roppolo

HOSPITAL NAME

Pennsauken Animal
Hospital and Urgent
Care

REFERRING VET

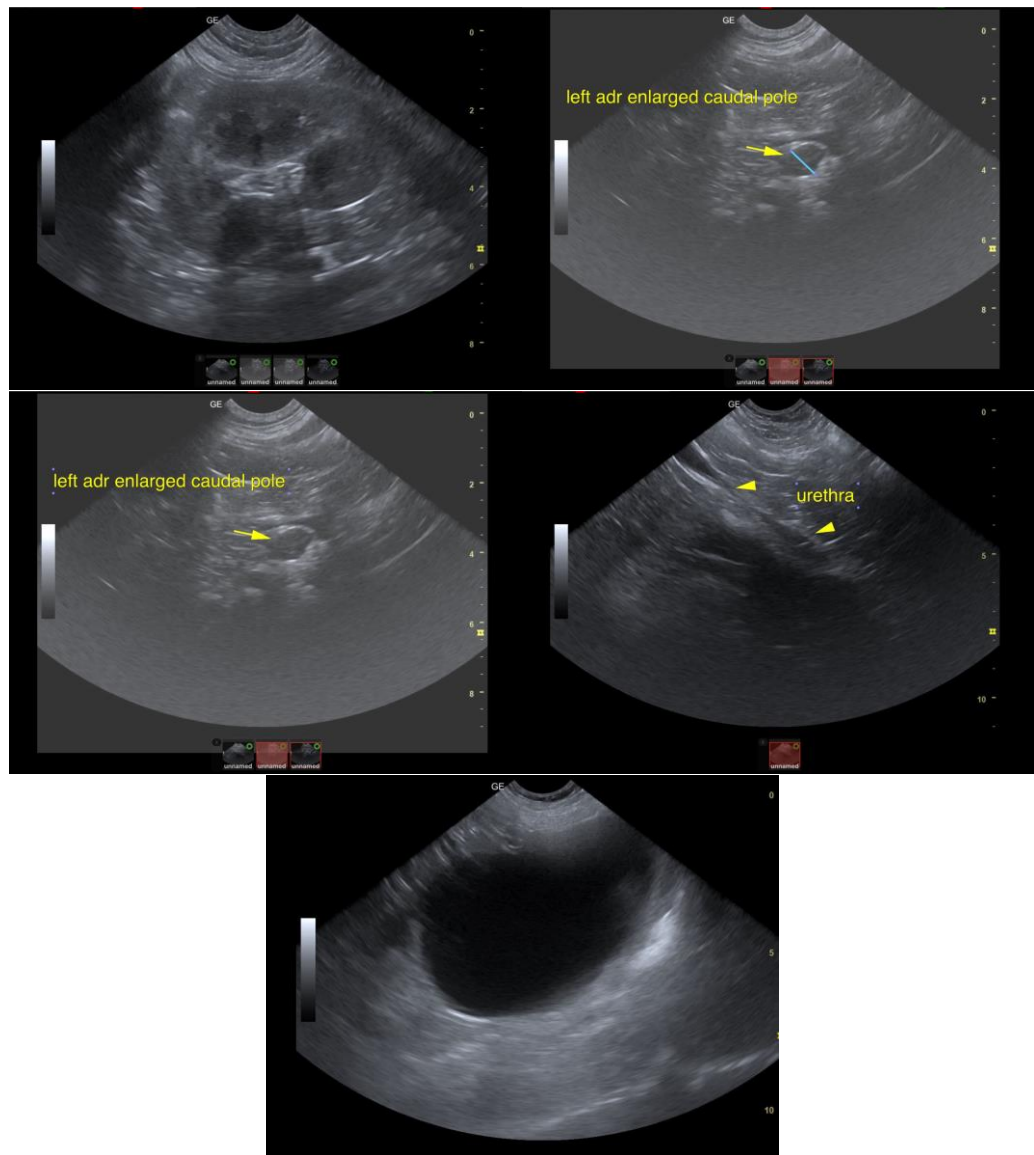
Dr. Roppolo

INVOICE

10510ag

DATE

05/02/2022



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.

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

Efficient & Accurate Cushing's Work up-Lindquist

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.



PATIENT

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.

Mia Blum

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.

SPECIES

Canine

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.

BREED

Pitbull Mix

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

SEX

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.

FS

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.

AGE

12 years

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, 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.

WEIGHT

30 pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

Address & treat concurrent disease first before performing Cushing's testing or testing will be artificially altered increasing false negatives and positives.

IMAGING PERFORMED BY

Michael Roppolo

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.

HOSPITAL NAME

Pennsauken Animal
Hospital and Urgent
Care

REFERRING VET

Dr. Roppolo

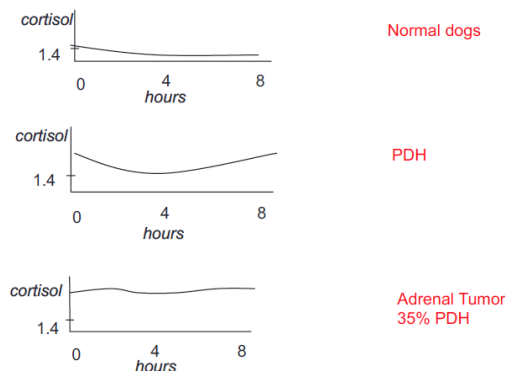
INVOICE

10510ag

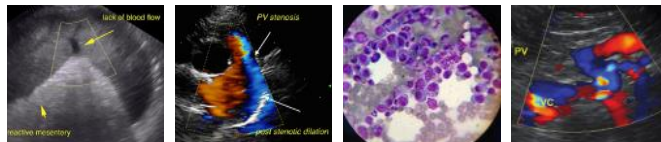
DATE

05/02/2022

LDDS



Courtesy: Rebecca Berg DACVIM, DECVIM



PATIENT

Mia Blum

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 Addisons, Iatrogenic Cushing’s, and Cushing’s therapy monitoring but problematic with initial Cushing’s diagnosis. First dx LDDST is suggested.

SPECIES

Canine

5) If **diabetic** then run both LDDST & ACTH stim but stabilize as much as possible first.

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.

BREED

Pitbull Mix

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.

SEX

FS

7) **Adrenectomy** 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.

AGE

12 years

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 .

WEIGHT

30 pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Michael Roppolo

HOSPITAL NAME

Pennsauken Animal
Hospital and Urgent
Care

REFERRING VET

Dr. Roppolo

INVOICE

10510ag

DATE

05/02/2022