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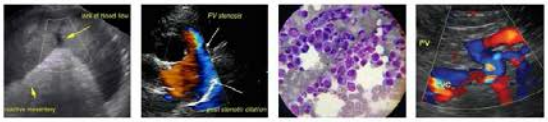

IMAGING PERFORMED BY
pawsonography@gmail.com 530-786-8340

PATIENT

Max Natalia

SPECIES

Canine

BREED

Chihuahua

SEX

Neutered Male

AGE

13 Years

WEIGHT

5.125 Pounds

INTERPRETED BY

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

IMAGING BY

Loetitia Saint-Jacques, LVT

HOSPITAL NAME

Grass Valley VH

REFERRING VET

Dr. Kristi Cortright

INVOICE

40306

DATE

8/10/22

PRESENTING CLINICAL SIGNS

No sedation but needs muzzle- Last 2 weeks drinking tons of water ie will drink as much as O puts down. This is very new for him, though we did catalog a lowe USG last year. This week USG 1.012, u/a otherwise wnl. Urine culture pending--may be reported wednesday. All else is normal, including chemistry and CBC. Survey abdominal rads for kidney stones etc were wnl. There are no changes to the household routine per O. O: BARH/anxious, BCS 4.5/9 CV-HR 130, no murmurs or arrhuthmias Resp-eupnic, RR 20, lung sounds wnl MS-thin but ok EENT-mild nuclear sclerosis OU, mild wax AU, Oral-mild to mod yellow soft tartar Neuro-wnl Abdomen tense but nonpainful A: polydipsia r/o UTI/pyelonephritis (but kidney values wnl) vs. paraneoplastic vs. endocrine (HAC, other) dental dz grade 2

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.

The prostate is normal in size (0.61 cm) and shape for this neutered male dog. The parenchyma is homogenous and the external margins are smooth. The prostatic urethra appears normal with no evidence of irregularity, invasion, mass effect or calculi.

The left kidney has a normal shape and size (3.29 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.

The right kidney has a normal shape and size (3.51 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.

Adrenal Glands

The left adrenal gland is normal in size measuring 0.34 cm at the caudal pole. It is observed in its normal position cranial to the left renal artery. It is normal in appearance (uniformly hypoechoic) and shape with no evidence of a mass effect.

The right adrenal gland is normal in size measuring 0.42 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.

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.

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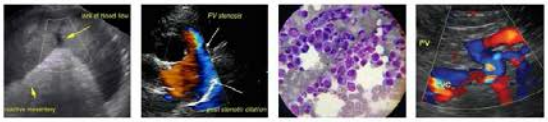

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Liver

The liver is large and hyperechoic with rounded margins. The parenchyma is homogenous echotexture. The visible portions of the vasculature and biliary tract appear normal. There are too numerous to count, discrete, hypoechoic nodules visualized within the hepatic parenchyma. These do not appear to deviate the margins of the liver. Examples of these nodules measure 1.1, 0.8, 0.4, and 0.69 cm.

The gall bladder lumen is significantly distended. Some areas of the wall appear mildly thickened with adherent debris. There is a large amount of primarily non-organized echogenic debris. There is no evidence of bile duct dilation. These changes can be consistent with an early gall bladder mucocele.

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. Duodenum wall measured 0.32 cm. Jejunum wall measured 0.24 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

- Large, hyperechoic liver with hypoechoic nodules – The diffuse hepatic changes are non-specific and can be seen with vacuolar hepatopathy, reactive change, nodular hyperplasia or, less likely, inflammatory/immune-mediated disease, infiltrative neoplasia, or other hepatopathy. The hypoechoic nodules do not deviate the hepatic margins, etc. A benign or neoplastic etiology is possible.

- Large gallbladder debris – The significance of the aggregated gallbladder sludge is unclear. This could represent an early mucocele, cholestasis, or may be secondary to fasting.

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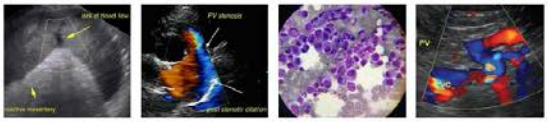

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INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

An obvious cause of the acute PU/PD is not readily visualized. The liver is large and hyperechoic with hypoechoic nodules. These could represent benign or neoplastic lesions, and based on historical information, the liver values are not elevated. Regardless, I would still consider a liver function test and a fine needle aspirate of the liver (ideally a nodule if possible). Additionally, there is a large amount of debris visualized within the gallbladder, but the gallbladder wall appears relatively normal and there is no evident inflammation. Options include either continued monitoring or starting Ursodiol and continuing to monitor this lesion.

Increased thirst and urination can be a challenging problem. Some issues such as early renal disease, Cushing's disease, behavioral, neurologic, dietary, electrolyte disturbances, etc. are not able to be diagnosed with ultrasound alone. Typically, the top 10 differentials for PU/PD can be ruled in/out with routine bloodwork, urinalysis and culture. several more can be evaluated with good history and imaging. Unfortunately, as you work your way down the list, the differentials become harder to definitively diagnose. In this case, I would consider the evaluation above for the liver in addition to Leptospirosis screening, looking carefully at any new treats or food changes, and urine culture (pending per history), and confirm normal calcium levels. This is the typical differential list I start with.

(1) Hyperadrenocorticism (may be a mixed primary PU and PD)
(2) Hypoadrenocorticism (either Addison's or hypocortisolism)
(3) Hypercalcemia
(4) Diabetes Mellitus
(5) Liver Disease (hepatic encephalopathy may be a mixed primary PU and PD)
(6) Pyelonephritis
(7) Leptospirosis (can present without azotemia)
(8) Chronic Renal Disease/Renal Failure (can present pre-azotemic, especially in dogs, but expect the BUN & creatinine not to be at the low end of the reference range)
(9) Hyperthyroidism
(10) Hypokalemia
(11) Pyometra (including stump pyometra in spayed dogs)
(12) Renal Tubular Diseases (glycosuria or Fanconi & Fanconi-like syndromes or RTA)
(13) Chronic Partial Urinary Obstruction or Post-Obstructive Diuresis
(14) Iatrogenic Disease due to medications (diuretics, phenobarbital, KBr; diets either high in salt [such as S/D] or very low in protein (such as U/D))
(15) Pheochromocytoma
(16) Polycythemia
(17) Hypertension Acromegaly (expect these patients to have diabetes)
(18) Paraneoplastic Syndromes (particularly splenic hemangiosarcoma?)
(19) Pericardial Effusion
(20) Atypical Cushing's and SARDS Psychogenic Polydipsia (as in a true behavior disorder with a compulsive element)
(21) Primary Non-Medical Polydipsia (aka "I drink a lot because I like it or I engage in activities that promote it, but that doesn't mean I'm sick")
(22) Psychogenic Polydipsia (as in a true behavior disorder with a compulsive element)
(23) Acromegaly (expect these patients to have diabetes)
(24) Primary Nephrogenic Diabetes Insipidus (Congenital Nephrogenic Diabetes Insipidus, other diseases that cause primary PU other than Congenital Diabetes Insipidus would be considered

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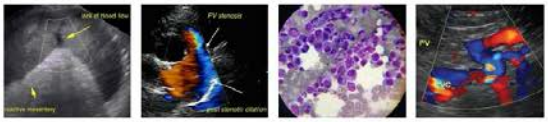

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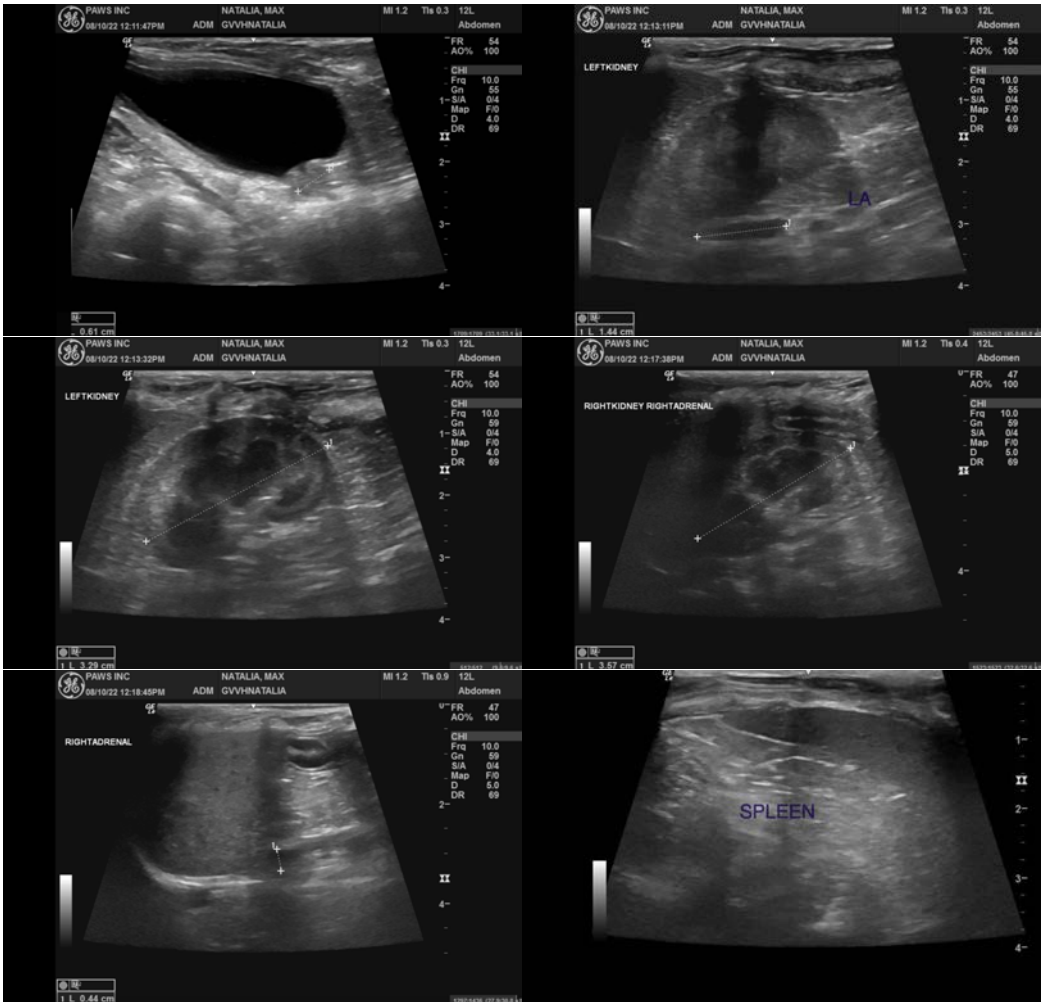
Acquired Nephrogenic Diabetes Insipidus)
(25) Central Diabetes Insipidus

**Keep in mind that diabetes insipidus is a VERY rare disorder and that water deprivation tests are rarely/if ever recommended-if possible consider referral to an internal medicine specialist if reaching that point.



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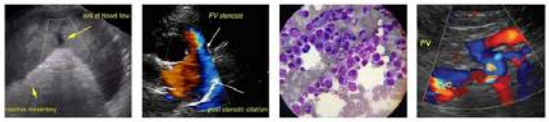

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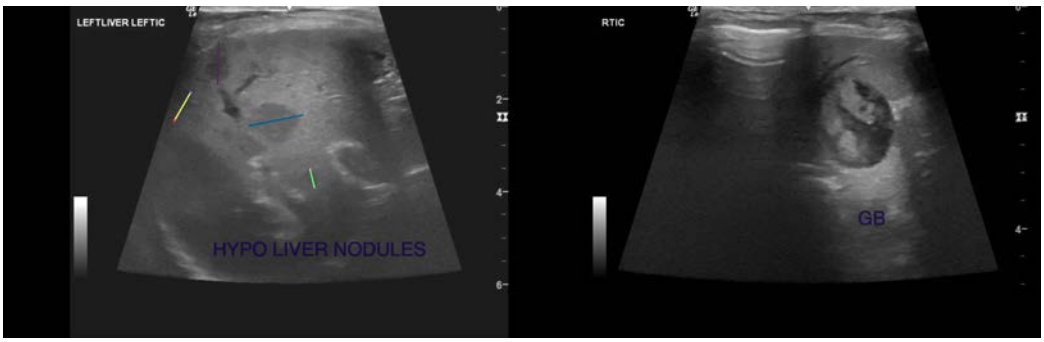

The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

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