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Clinical Sonography & Telecytology
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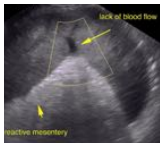
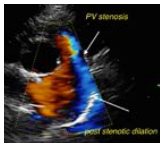
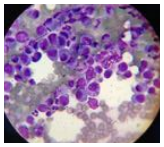
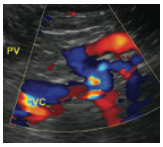

SonoPath.com
1-800-838-4268 info@sonopath.com

**PATIENT**
Daisy Millstein

**SPECIES**
Canine

**BREED**
Chihuahua Cross

**SEX**
Spayed female

**AGE**
10 ½ years

**WEIGHT**
27 lbs

**INTERPRETED BY**
Dr Brittany Sinclair, BVSc(hons), DACVECC

**IMAGING PERFORMED BY**
Dr. Wiley

**HOSPITAL NAME**
Petvacx AH

**REFERRING VET**
Dr. Wiley

**INVOICE**
44081

**DATE**
5/1/23

## PRESENTING CLINICAL SIGNS

History: Increasing ALKP and ALT on annual wellness bloodwork. New heart murmur this year on annual, V/VI systolic PMI left apical
Abnormal PE/Chem/CBC/UA Results: 2021: ALKP 744 ALT 236; 2023: ALKP 2388 ALT 233
Increased platelets, UA Within Normal Limits USG 1.027

## ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

### *Urinary System*

The urinary bladder, trigone, and visible pelvic urethra were of normal thickness. The ureters were not visible which is normal. There was normal wall layering with no masses, uroliths or abnormal thickening visualized. Urine was anechoic. No evidence of inflammatory or neoplastic changes were noted.

The kidneys have an irregular capsule and with mild hazing of corticomedullary definition. Pinpoint areas of cortical mineralization present in left cortex. No evidence of pelvic dilation was present. The left kidney measured 5.45 cm. and the right kidney measured 5.99 cm.

### *Adrenal Glands*

Both adrenal glands were visualized and recognized. Left adrenal gland was normal in size, structure and echogenicity. Capsule, cortex, and medullary definition were normal for this age patient. Right adrenal gland was prominent with a solitary small hyperechoic nodule visualized. The left adrenal gland measured 1.4 cm in length x 0.35 cm at the caudal pole and 0.42 cm at the cranial pole. The right adrenal gland measured 2.11 x 0.51 cm at the caudal pole and 0.91 cm at the cranial pole.

### *Spleen*

The spleen was normal with a smooth homogeneous parenchyma hyperechoic to liver and renal cortical parenchyma and smooth capsule, with normal splenic vasculature with no signs of congestion or thrombosis. No sonographic evidence of acute or chronic inflammatory, neoplastic, or infarct changes were noted.

### *Liver*

The liver is subjectively normal in size with slight rounding of lobes and the parenchyma contains multifocal variably sized hypoechoic nodules and a coarse appearance. No specific masses are visualized. Vascular and biliary tracts are of normal volume with no evidence of congestion. No pathological hepatic lymphadenopathy observed.

The gall bladder is moderately distended with anechoic fluid, with hyperechoic non-shadowing gravity dependent debris present. There is no surrounding free fluid or signs of active inflammation.

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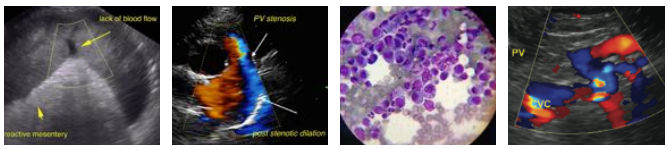


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### *Gastrointestinal*

The stomach contains ingesta. It measures at a normal thickness of 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.

Proximal duodenum contains small volume of fluid. The visualized areas of 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. 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 base and limbs of the pancreas were observed to be largely isoechoic to surrounding omental fat. Pancreatic duct and capsular contour and parenchyma were normal. No overt evidence of active inflammatory or neoplastic disease was noted.

### *Lymph Nodes*

No clinically significant lymphadenopathy or abnormalities noted.

### *Free Abdomen*

No masses or free fluid were noted.

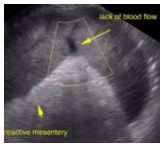
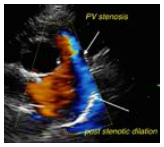
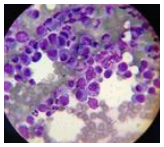
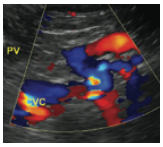
## ULTRASONOGRAPHIC FINDINGS

### Primary Findings

1. Vacuolar hepatopathy suspected
2. Gall bladder debris
3. Prominent right adrenal gland with nodule
4. Degenerative renal changes

## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Liver changes are most consistent with a vacuolar hepatopathy, though this diagnosis cannot be definitively made with ultrasound imaging alone. Vacuolar degeneration is a common nonspecific indicator of hepatocyte injury which is most commonly secondary to exogenous steroid exposure, hyperadrenocorticism, or an idiopathic age related change, though other endocrinopathy (hypothyroidism), infectious or inflammatory hepatitis (bacterial, viral, auto-immune other), and neoplasia among other things remain possibilities. In the face of elevated liver enzymes liver aspirate is recommended to further characterize these ultrasonographic changes. Ultimately liver biopsy is

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generally required for definitive diagnosis and should be considered if significant clinical signs or severe liver enzyme elevations are progressive despite empiric treatments (SAM-E, milk thistle, Vitamin E, ursodiol). Bile acid profile could be considered to assess liver function if clinically indicated. Clinical signs associated with vacuolar hepatopathy often reflect underlying disease. Idiopathic vacuolar hepatopathy may be asymptomatic and treatment is not necessarily indicated or effective at reducing liver enzymes. Imaging should be rechecked on a routine basis (q3-6mo) or if further significant increase in liver enzymes and/or new clinical signs are noted.

Gall bladder debris is minimal and may be an incidental finding given lack of surrounding inflammation. In the face of elevated ALKP ursodiol could be given as a choleretic and empiric treatments (SAM-E, milk thistle, Vitamin E) could be tried. If liver supportive medications do not improve liver enzymes, a course of empiric antibiotics (clavamox, enrofloxacin) could be considered to cover for infectious cholangiohepatitis, though the lack of surrounding inflammation makes this less likely. Imaging should be rechecked on a routine basis for monitoring (q3-6mo) or if further significant increase in liver enzymes and/or new clinical signs are noted. If otherwise clinically indicated, investigation for endocrinopathy such as hyperadrenocorticism or hypothyroidism could be considered as an underlying cause predisposing to gall bladder debris accumulation.

Right adrenomegaly is mild and may represent stressful illness or hormonal stimulation as is seen with hyperadrenocorticism. If corresponding clinical signs are present, testing for hyperadrenocorticism should be considered (ACTH stimulation test vs LDDST). Hyperadrenocorticism is a common cause of vacuolar hepatopathy and corresponding elevated liver enzymes.

Renal changes are likely age related degeneration. Correlate clinical significance with semi-annual blood work/urinalysis findings and clinical signs.


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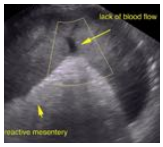
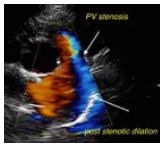
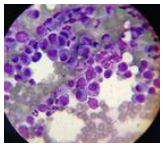
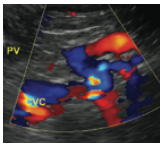

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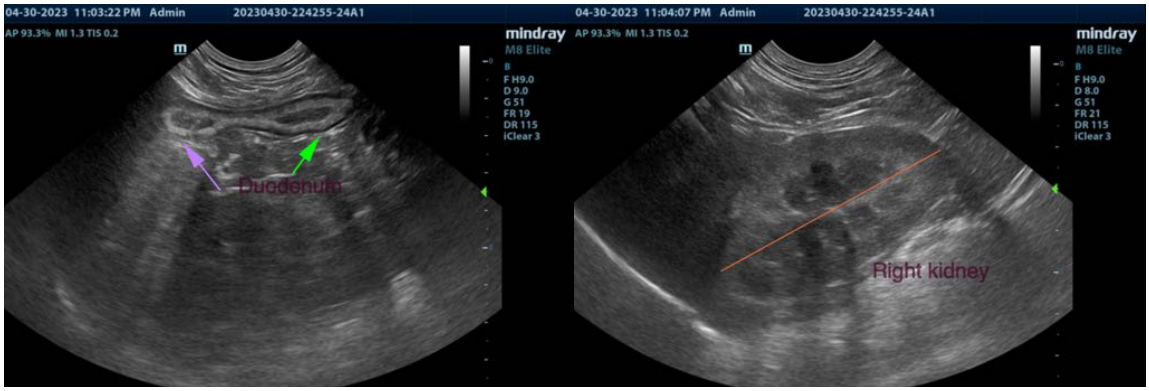


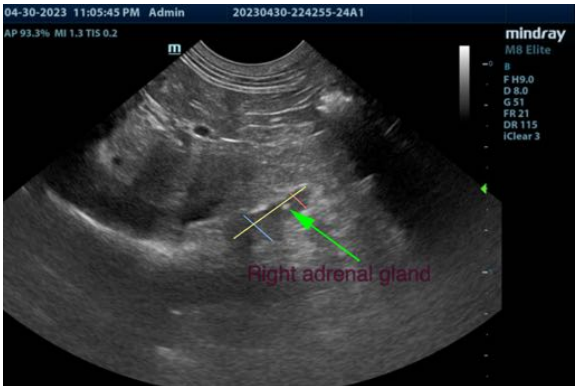


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**The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.**

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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info@SonoPath.com