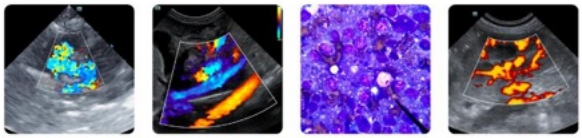



**PATIENT**

Doug Havens

**SPECIES**

Canine

**BREED**

Shih Tzu mix

**SEX**

Male, neutered

**AGE**

**WEIGHT**

8.4 lbs.

**INTERPRETED BY**

Andrea Nicastro, DVM, Diplomate ACVIM (*Small Animal Internal Medicine*)

**IMAGING PERFORMED BY**

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## PRESENTING CLINICAL SIGNS

Pt has had chronic intermittent bloody diarrhea episodes which in the past have improved with Metronidazole. Also has chronically elevated liver enzymes. In September ALT was in the 300s, now the ALT is 1355. The ALP is 10,135, GGT 423, normal T-bili, USG 1.019, 1+ proteinuria, inactive sediment. Hematocrit 39%, thrombocytosis, T4 0.5. Pt was diagnosed with Cushing's disease via ACTH stimulation test. Was started on Vetoryl twice a day but had side effects so the medication was discontinued. In mid-December was started on a homeopathic treatment for Cushing's disease. Currently has bloody diarrhea. Previous fecal negative.

## ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

### *Urinary System*

The urinary bladder wall is normal in thickness and the mucosal surface is smooth. The bladder is moderately distended. Luminal contents are anechoic. No cystic calculi are observed. The region of the trigone and the visible portion of the proximal urethra are normal.

The prostate is normal in size (0.64 cm in width) and shape. Parenchyma is homogenous. The prostatic urethra appears normal without evidence of dilation or obstruction.

The left kidney is normal in size (4.01 cm in length) with a normal shape, architecture and smooth peripheral margins. There is a normal 1:3 cortex to medulla ratio with moderate to severe loss of corticomedullary distinction. Hyperechoic shadowing diverticular foci are visualized. Pinpoint hyperechoic foci are observed within the cortex. There is no evidence of pyelectasia, infarcts or hydroureter. Renal vasculature is normal.

The right kidney is normal in size (4.11 cm in length) with a normal shape, architecture and smooth peripheral margins. There is a normal 1:3 cortex to medulla ratio with moderate to severe loss of corticomedullary distinction. Hyperechoic shadowing diverticular foci are visualized. Pinpoint hyperechoic foci are observed within the cortex. There is no evidence of pyelectasia, infarcts or hydroureter. Renal vasculature is normal.

### *Adrenal Glands*

The left adrenal gland is enlarged (0.91 cm at cranial pole) (0.75 cm at caudal pole) with an irregular shape. A 0.82 x 0.59 cm irregular hyperechoic to heterogeneous nodule is observed at the cranial aspect. The glandular echogenicity and detail at the caudal aspect are unremarkable. The phrenicoabdominal vein and surrounding vasculature are normal.

The right adrenal gland is enlarged (0.89 cm at cranial pole) (0.97 cm at caudal pole) with an irregular shape. A 0.95 x 0.51 cm irregular hyperechoic to heterogeneous nodule is observed at the cranial aspect. The glandular echogenicity and detail at the caudal aspect are unremarkable. The phrenicoabdominal vein and surrounding vasculature are normal.

### *Spleen*

The spleen is normal in size (0.60 cm in width at the level of the hilus) with a normal capsular contour. There is appropriate echogenicity and echotexture. A few hyperechoic nodules are observed throughout the organ. Splenic vasculature is normal.

### *Liver*

The liver is subjectively enlarged with swollen peripheral contours. The parenchyma is hyperechoic relative to the spleen and subtly mottled in appearance. No focal lesions are observed. Vascular and

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biliary tracts are of normal volume with no evidence of congestion. The portal vein to caudal vena cava ratio is approximately 1:1.

The gall bladder lumen is distended. The wall is normal in thickness. A moderate amount of aggregated, echogenic to mineralized, partially dependent to suspended sludge is observed within the lumen. Some peripheral striations are observed. The cystic and common bile ducts are normal/not seen.

### *Gastrointestinal*

The gastric lumen is not distended. The gastric wall and pylorus are normal in thickness with a normal layering pattern. The pyloric outflow tract is patent. The small intestinal lumen is not dilated. The small intestinal wall is normal in thickness with a normal layering pattern and appropriate mural detail. Discreet masses are not identified. The colonic wall is normal. There is no evidence of an obstructive pattern.

### *Pancreas*

The base and limb of the pancreas is visible with normal curvilinear peripheral contours. The parenchyma is hyperechoic relative to surrounding omental fat and slightly mottled in appearance. The pancreatic duct is visible but not overtly dilated. There is no evidence of peripancreatic inflammation or effusion.

### *Lymph nodes*

The abdominal lymph nodes are normal/not visible.

### *Free Abdomen*

There is no obvious evidence of free fluid.

### *Other*

A brief echocardiogram reveals no evidence of pericardial effusion or obvious right atrial/auricular mass.

## ULTRASONOGRAPHIC FINDINGS

**Primary Findings:**

- The gallbladder changes are most consistent with a developing mucocele.
- The hepatic parenchymal changes are nonspecific and could be secondary to vacuolar hepatopathy (i.e., endocrine, idiopathic), inflammatory disease (i.e., cholangiohepatitis, chronic hepatitis), hepatotoxicosis (i.e., copper, other), infiltrative neoplasia and/or other hepatopathy.
- Bilateral adrenomegaly. The bilateral adrenal nodules could be consistent with focal nodular hyperplasia, adenomas or less likely, emerging adenocarcinomas, pheochromocytomas, other.

**Secondary Findings:**

- Bilateral nonspecific, age-related renal changes with dystrophic mineralization
- The pancreatic changes are most consistent with age-related parenchymal remodeling, potentially secondary to a prior inflammatory episode, early fibrosis or chronic pancreatitis.
- Hyperechoic splenic nodules are most consistent with meylolipomas with a low possibility of more insidious splenic pathology.

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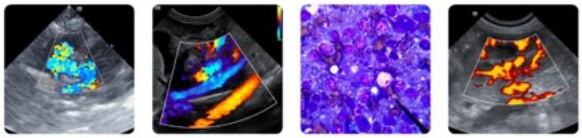

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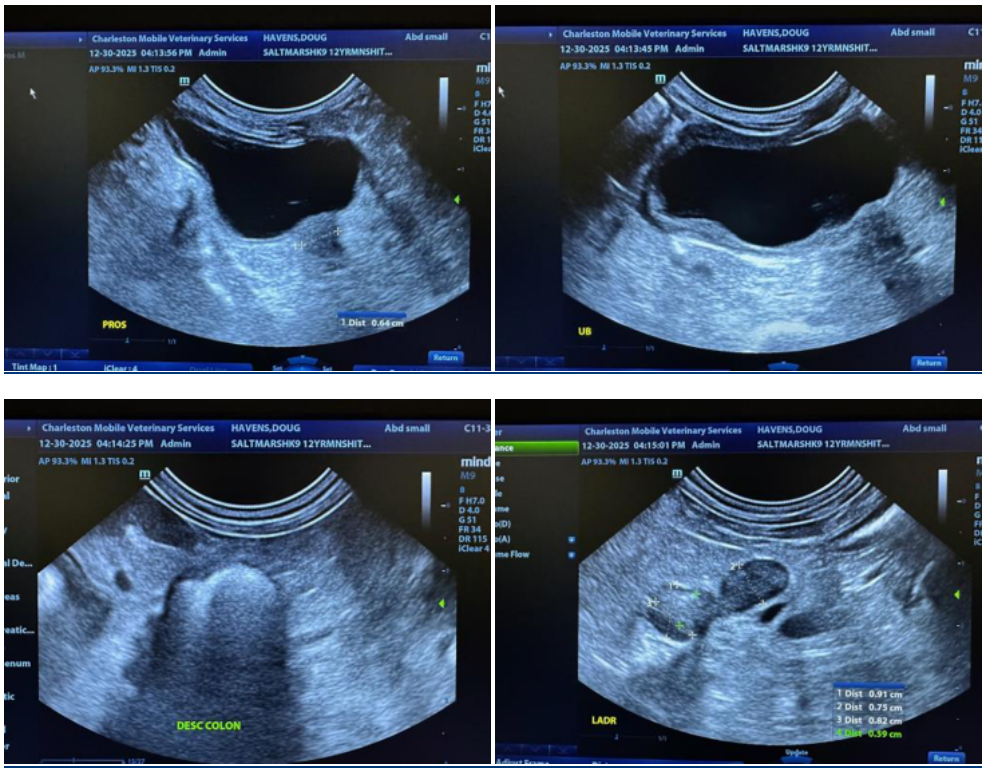
## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

- To further evaluate for hepatic disease, consider hepatic tissue sampling (i.e., aspirates or biopsies) assuming normal clotting status. If biopsies are pursued, aerobic and anaerobic bile cultures and hepatic copper quantitation should be performed.
- If a conservative approach is desired, consider empirical treatment for bacterial cholangiohepatitis (amoxicillin-clavulanic acid, Denamarin). If no improvement in the liver values is seen within 7-10 days of initiating therapy, antibiotics should be discontinued, and hepatic tissue sampling reconsidered. If liver values improve, continue therapy for at least 4-6 weeks and 1 week beyond normalization of the liver values.
- Given the gall bladder changes, Ursodeoxycholic acid (Ursodiol) is recommended. Serial sonographic monitoring (e.g., every 6-8 weeks) of the gall bladder is recommended to assess for progression to a fully formed mucocele. If progression occurs, a cholecystectomy may be warranted.
- Consider re-testing for Cushing's disease with a low-dose dexamethasone suppression test or ACTH stimulation test if clinical signs (i.e., PU/PD) develop in the future.
- Regarding the GI signs, consider the following:
  1. Prophylactic deworming with fenbendazole
  2. GI panel including serum cobalamin, folate, TLI and PLI
  3. Limited antigen or hydrolyzed protein diet trial
  4. Initiation of a probiotic as well as a fiber supplement
  5. +/- endoscopic or surgical GI biopsies



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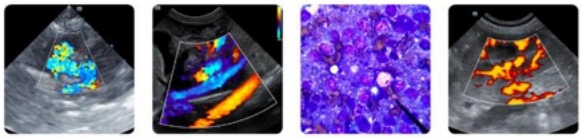

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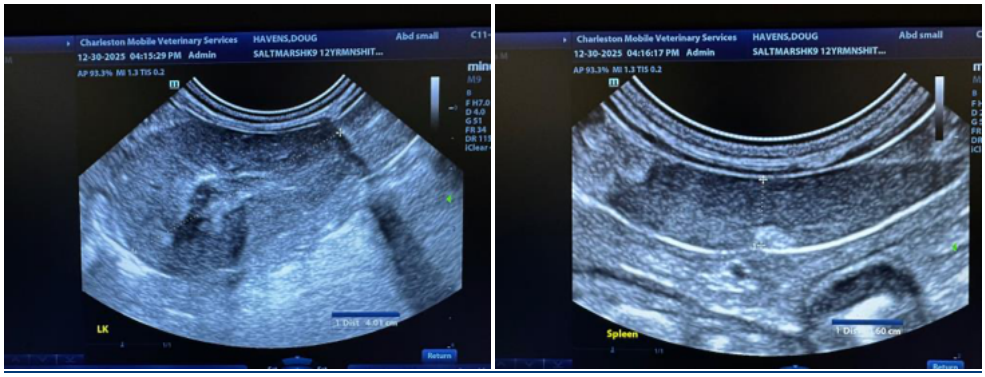


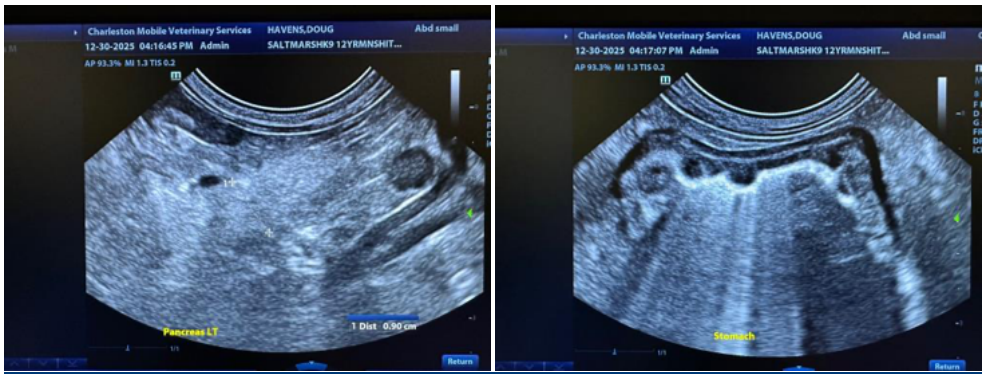


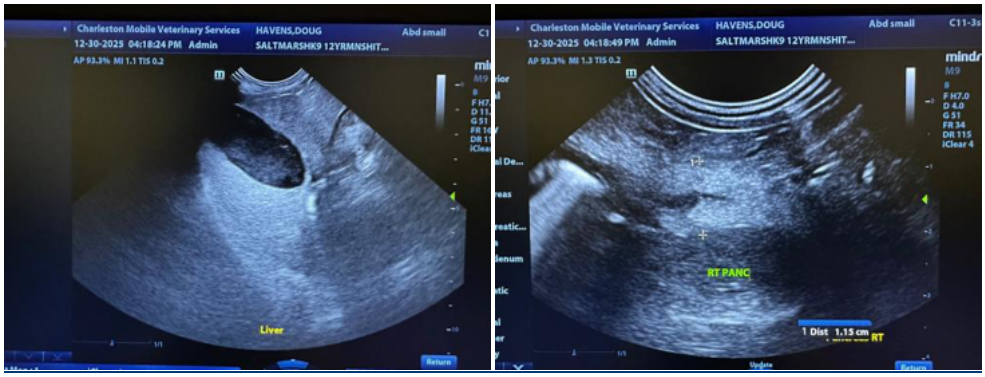


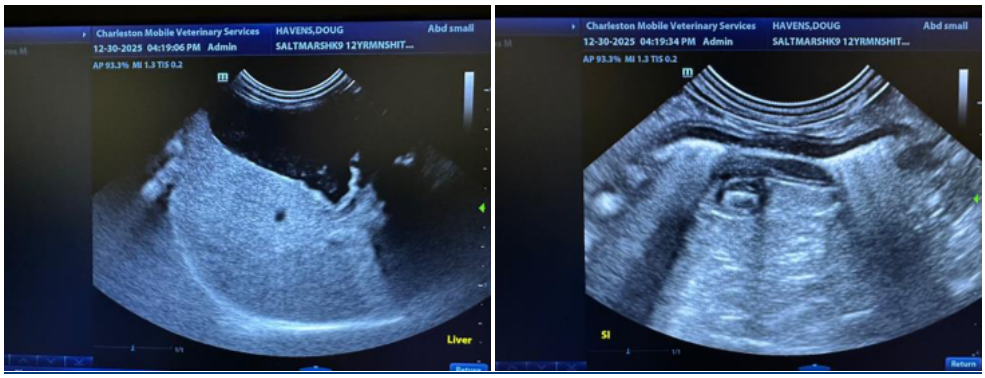

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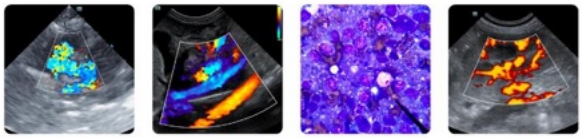

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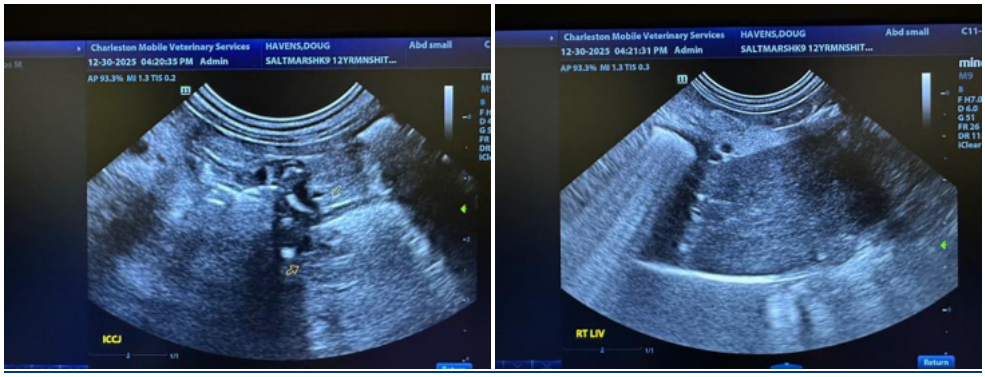


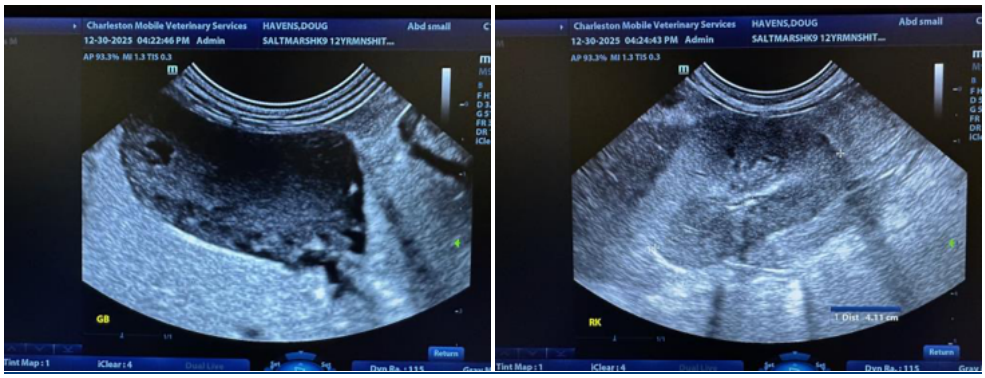


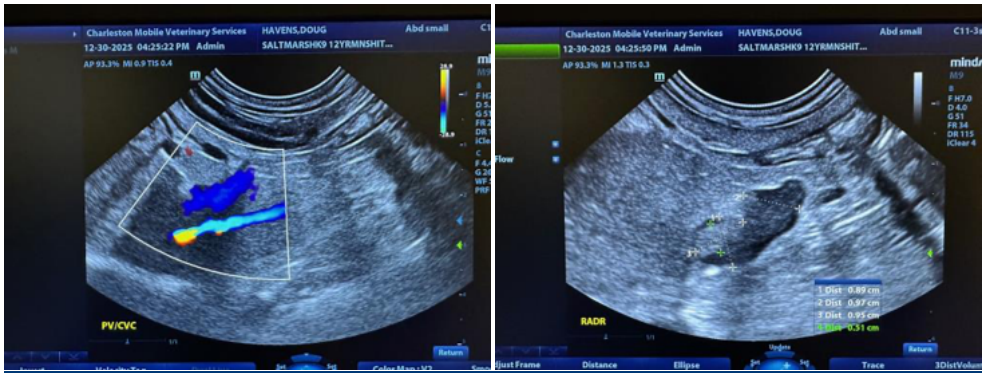


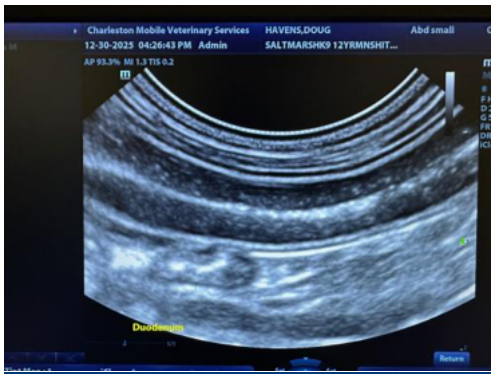

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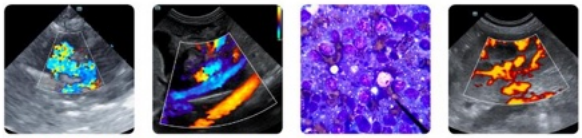

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**The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.**

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.

Andrea Nicastro, MPH, DVM, Diplomate DACVIM (Small Animal Internal Medicine)
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