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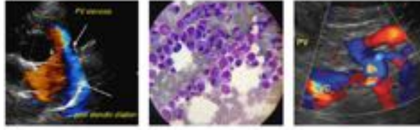

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Clinical Sonography & Telecytology

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PATIENT

Charlie Prohaska
41922A

SPECIES

Canine

BREED

Puggle

SEX

Neutered male

AGE

11 years

WEIGHT

12.4 kg

INTERPRETED BY

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

IMAGING PERFORMED BY

Tom McNeill

HOSPITAL NAME

SVS Imaging CT

REFERRING VET

Madison Veterinary Specialists Dr. McDaniel

INVOICE

31531

DATE

7/11/22

PRESENTING CLINICAL SIGNS

Charlie had an acute onset of vomiting, and diarrhea that progressed overtime over the last week. Charlie vomited once on ~7/5, and vomited 2x while owner was at work a few days later. He was taken to Govenor's Dodge park, and vomited a few times overnight following this outing. He was taken to rDVM on 7/7/22, and in transit vomited 3-4 times, and started having diarrhea. He had abdominal radiographs and blood work performed revealing hypoalbuminemia, a stress leukogram, and mild thrombocytopenia. Abdominal radiographs did not reveal evidence of an obstructive pattern. He was given an injection of cerenia, vitamin K, and intravenous fluids. He represented the following day, and progressive hypoalbuminemia was noted, and was advised to have referral.

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The **urinary bladder** is not fully distended, but well enough to evaluate wall thickness. The wall is considered thickened, measuring up to 0.31 cm. It is mildly, but diffusely irregular. The contents of the urinary bladder are anechoic, i.e., there is no evidence of sediment, cystoliths, polyps or a mass. No abnormalities are noted with the trigone or proximal urethra. Anechoic fluid surrounds the urinary bladder.

The **prostate** is homogenous and measures 1.02 cm (longitudinal view) and 0.89 cm (transverse view); within normal limits for a neutered male.

Kidneys

The **left** kidney measures 4.58 cm. The capsule is smooth. A mild loss of the normal definition of the cortico-medullary junction is present. Small mineralizations of the diverticulae and pelvis are present, without evidence of nephroliths or pyelectasia. An accumulation of intrapelvic fat is noted. A moderate amount of effusion is present surrounding the kidney.

The **right** kidney measures 4.53 cm. The capsule is smooth. Its overall architecture, including the definition of the cortico-medullary junction, is preserved. Small mineralizations of the diverticulae and pelvis are present, without evidence of nephroliths or pyelectasia. An accumulation of intrapelvic fat is noted.

Aortic bifurcation/trifurcation No abnormalities observed, however, see other, below.

Adrenal Glands

The **left** adrenal gland measures 0.58 cm at the cranial pole, 0.49 cm at the caudal pole. The cranial pole is slightly more "plump" than the caudal pole, however, no abnormalities are noted with the gland's overall architecture, echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

The **right** adrenal gland measures 0.93 cm at the cranial pole, 0.44 cm at the caudal pole. The cranial pole is "thicker" than the caudal pole, however, there is no evidence of a mass or nodule. No abnormalities are noted with the gland's echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

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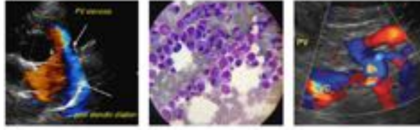

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Spleen

The spleen appears to be within normal limits in size, architecture, and echogenicity. The capsule is smooth. No abnormalities are observed with its vasculature, i.e. congestion and thrombi are not identified. Although subtle, the echotexture is diffusely miliary.

Liver

There are no obvious signs of hepatomegaly and its borders are smooth and sharp. The liver's echotexture is homogeneous to very mildly heterogeneous, i.e. a mildly coarse or granular echotexture is observed. Focal lesions are not observed and no abnormalities are observed with the hepatic vessels. The mesentery medial to the liver is hyperechoic, however, it is difficult to determine if this is due to inflammation, or the presence of ascites.

The **gallbladder (GB)** is mildly distended with a small to moderate amount of free floating, gravity-dependent and inspissated echogenic material. The GB wall is within normal limits to the high end of the normal reference range in thickness (1.1 mm). It is not considered overtly hyperechoic. The cystic duct and common bile duct are not visualized, however, dilation of intrahepatic bile ducts is not observed, i.e., there are no signs of an obstruction.

Gastrointestinal

The gastric wall is at the high end of the normal reference range (0.48 cm). Although the wall layers are defined, the submucosa is more prominent and thickened in certain regions. Comments cannot be made regarding peristalsis (still images).

The duodenal wall thickness is within normal limits and the definition of the wall layers is preserved, however, subjectively, the mucosa is more prominent than normal, with very mild stippling, and the submucosa is also mildly prominent.

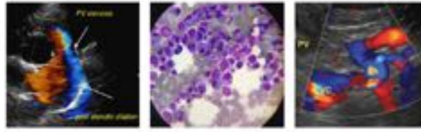
The jejunum is at the high end of the normal reference range. Although the definition of the wall layers is preserved, the mucosa is mildly prominent. No obvious abnormalities are noted with the ileo-cecal-colic junction. Abnormally dilated loops of bowel are not observed.

The colonic wall varies between the normal reference range to mildly thickened (0.21 cm). Although mural detail is not always conserved, the wall layers are not "fuzzy", i.e. the changes are more consistent with inflammation, for example, recent episodes of diarrhea, rather than neoplasia.

Pancreas

The **right limb** is very mildly enlarged and hypoechoic. Its contours are slightly irregular. A couple of hyperechoic foci are noted, which may be due to fibrosis. The latter may occur as a result of age-related changes, secondary to previous episodes of pancreatitis, fat deposition, mineralization, as well as amyloid deposition. The surrounding mesenteric fat is moderately hyperechoic. Overt signs of neoplasia are not noted.

Another region of the pancreas has a mildly coarse echotexture, consisting of pinpoint to punctate hyperechoic foci scattered throughout the parenchyma. The changes are suggestive of fibrosis, respectively. The surrounding mesentery is mildly hyperechoic; it is difficult to determine whether the hyperechogenicity is due to active pancreatitis or the presence of ascites. Signs of neoplasia are not appreciated.



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Other

A distended mesenteric vein is noted mid abdomen. An echogenic structure, approximately 1.24 cm in diameter x 1.24 cm (in one view), is visualized within the vein. Blood flow is absent when evaluated with colour Doppler. As per the sonographer, it can be traced to the portal vein where blood flow becomes visible, where the next vessel enters in cranially.

Lymph nodes (LN)

One of the mesenteric LNs is observed; it is mildly hypoechoic, but no major abnormalities are noted.

Abdominal effusion

A large amount of anechoic effusion is visualized throughout the abdomen, e.g., cranio-ventrally to and surrounding the urinary bladder, between the liver lobes and surrounding the spleen. A small amount is present surrounding both kidneys.

ULTRASONOGRAPHIC FINDINGS

- **Gallbladder**: Gallbladder sludge is most likely clinically insignificant, i.e., there are no signs of a mucocoele. Overt signs of cholecystitis are not evident, however, an infection of the bile due to bacteria ascending from the gastrointestinal tract must be considered. Also, despite the subtle gastrointestinal changes, the presence of gallbladder sludge does not rule out the possibility of gastroesophageal reflux disease (GERD) in some patients.

- **Spleen**: Although subtle, the echotexture is diffusely miliary. This may be due to extramedullary hematopoiesis if Charlie is anemic, or splenitis. Lymphoma is another possible differential diagnosis, but considered less likely.

- **Pancreatitis**: Active pancreatitis and age-related changes are suspected. The hyperechogenicity of the mesentery surrounding the pancreas may be partly due to the presence of ascites, however, pancreatic inflammation is suspected. Signs of neoplasia are not appreciated.

- **Gastrointestinal tract**: The changes are subtle and somewhat subjective, however, they are also suggestive of inflammation, including a protein-losing enteropathy. Lymphangiectasia cannot be excluded despite the absence of striations.

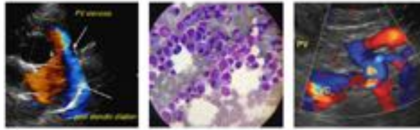
- **Other**: High index of suspicion of a **thrombus within the mesenteric vein**, possibly a result of protein-losing enteropathy, +/- protein-losing nephropathy.

- **Kidneys**: Age-related changes are suspected. There are no obvious abnormalities suggestive of glomerulonephritis or pyelonephritis. Note, classical sonographic abnormalities are not always present with a diagnosis of pyelonephritis.

- **Urinary bladder**: A urinary tract infection with secondary cystitis are suspected.

- **Liver**: No major abnormalities are noted. A reactive hepatopathy could explain the subtle changes noted.

- **Ascites**: There is no evidence of a mass. A protein-losing enteropathy (PLE) is the most likely cause given the history and clinical signs described. A protein-losing nephropathy and



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vasculitis are potential differential diagnoses depending on blood work results, travel history, etc.

- **Adrenal glands**: The right adrenal gland is enlarged for a dog of Charlie's stature, however, it is not uncommon to see the shape of a "Shepherd's hook" at the cranial pole, with no other clinical signs suggestive of hyperadrenocorticism. The enlarged right cranial pole of the right gland is not considered clinically relevant at this time.

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

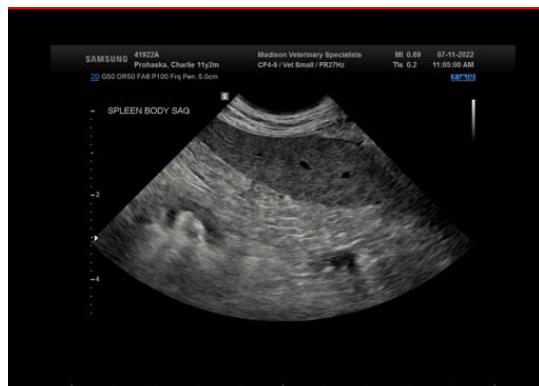
Urinalysis and urine culture

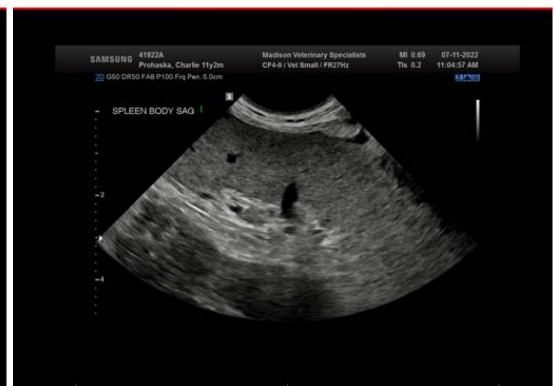
Urine protein: creatinine ratio is the culture is negative.

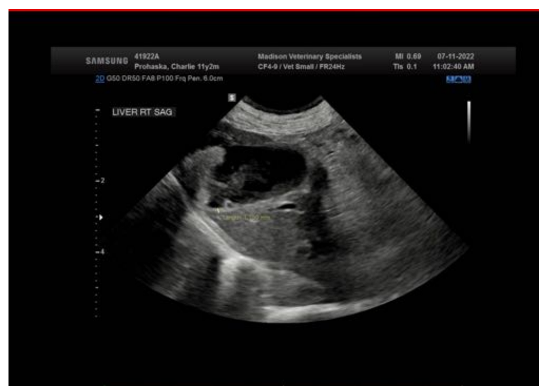
Thoracic radiographs to exclude concurrent effusion associated with PLE. Will also help rule out neoplasia.

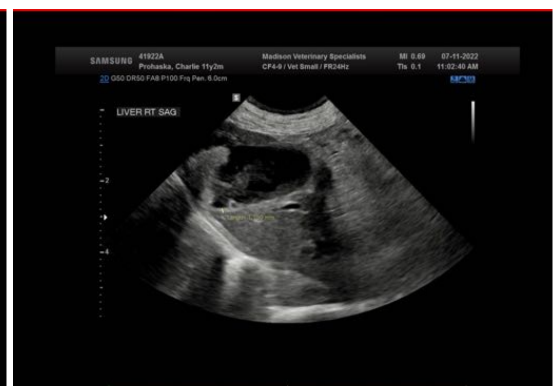
Depending on Charlie's response to therapy and blood work (e.g. schistocytes), fine needles aspirates of the spleen may be warranted.

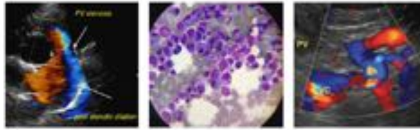
There is no evidence of a ruptured gallbladder, however, if Charlie is febrile or if his deteriorates, cytology of the ascites (to exclude peritonitis) is suggested.











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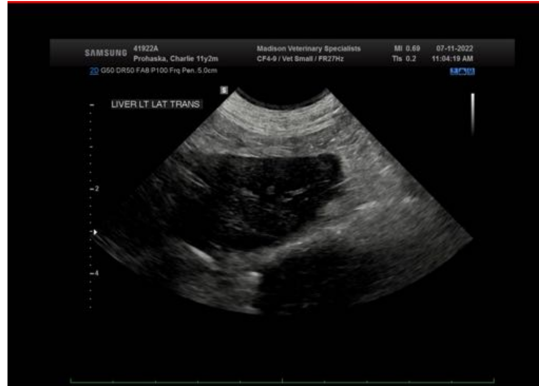

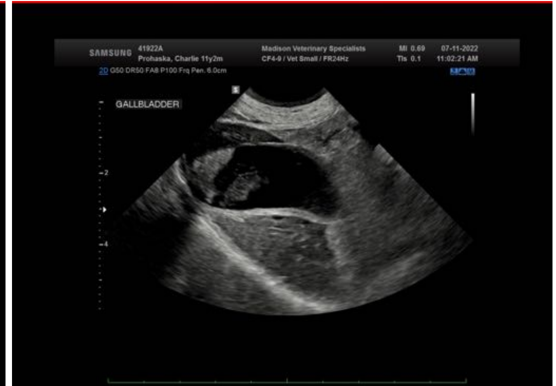

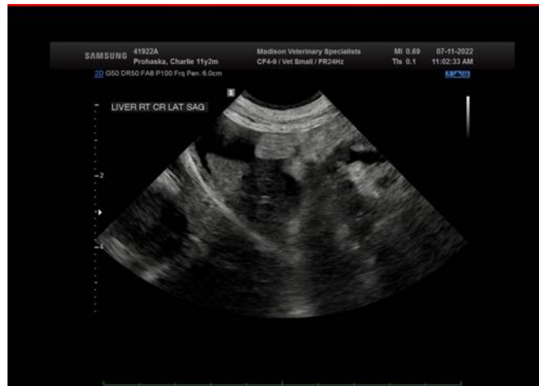

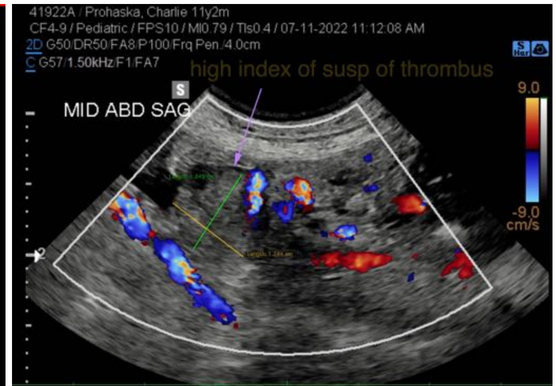

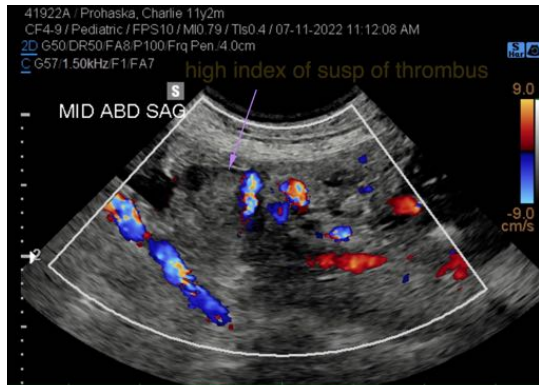

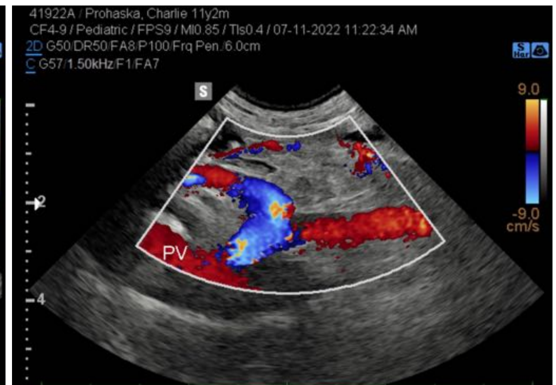

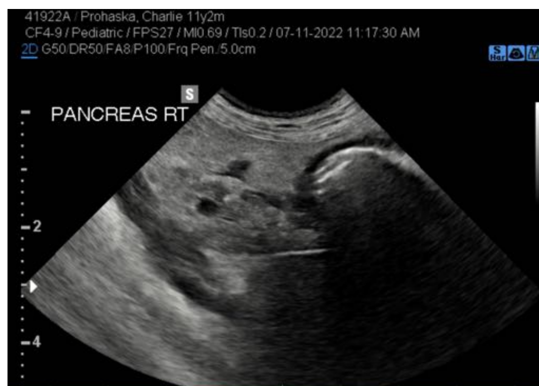

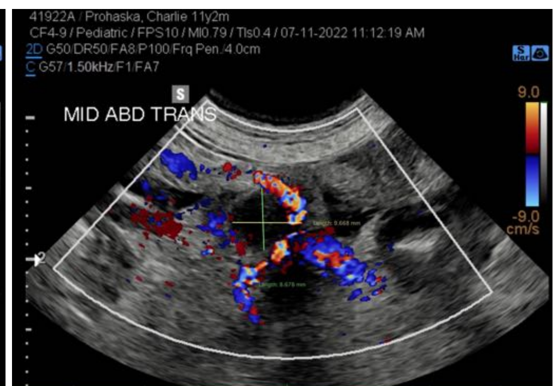

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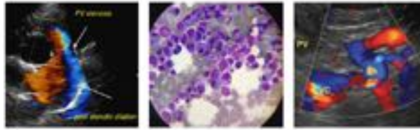

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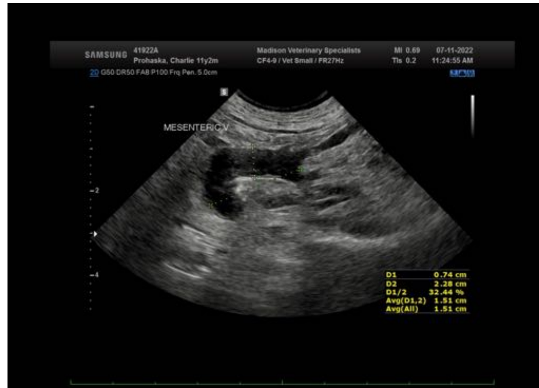

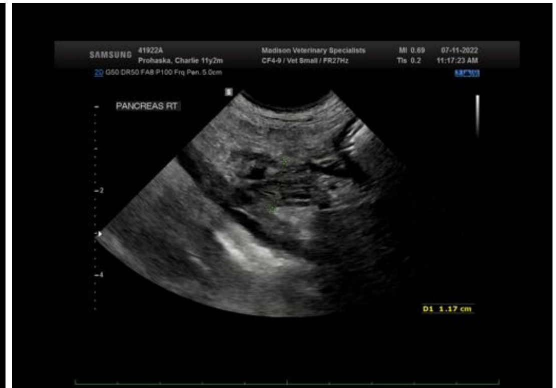

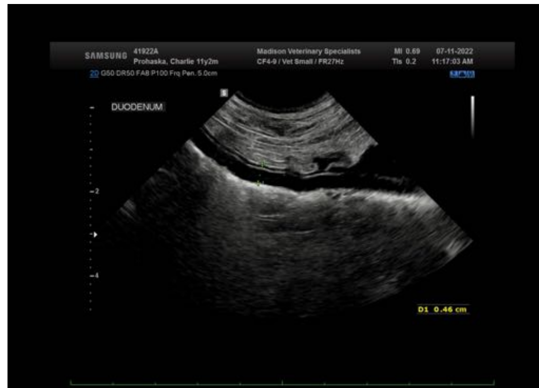

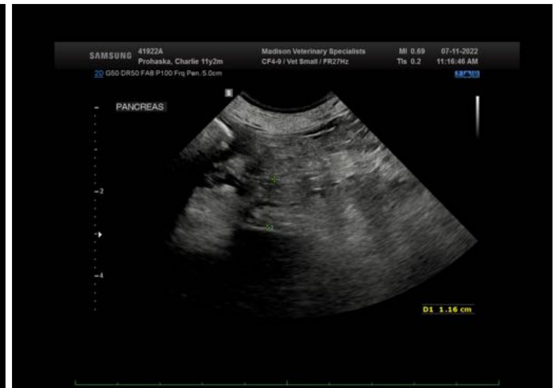

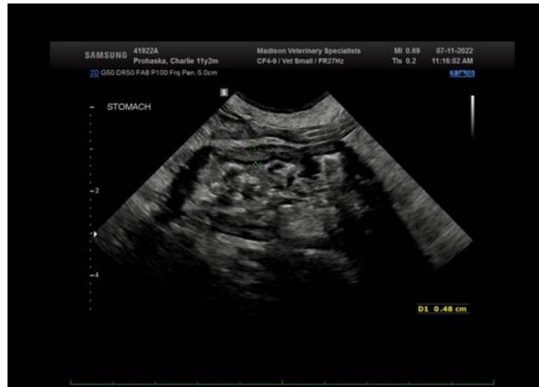

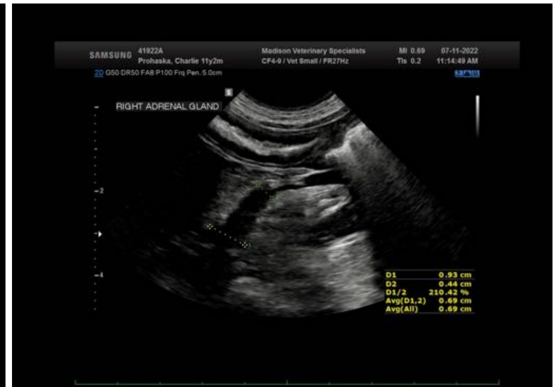

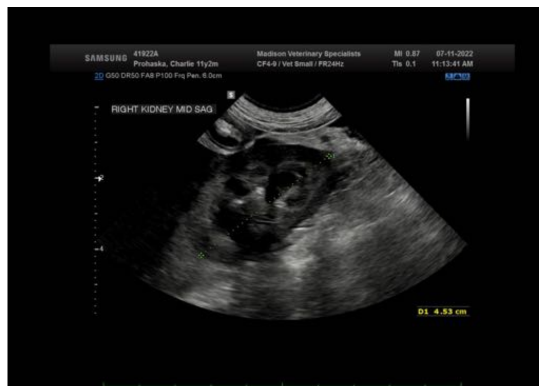

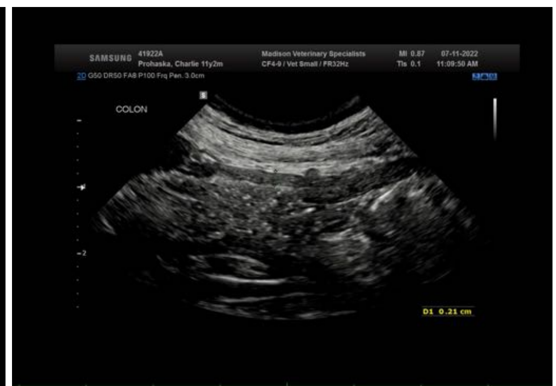

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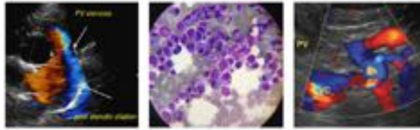

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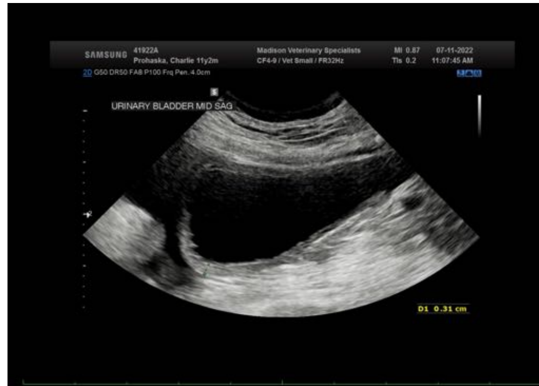

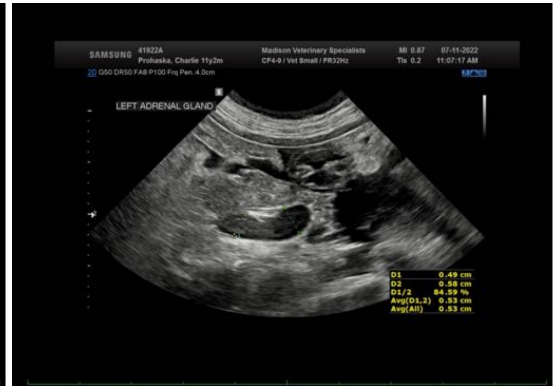

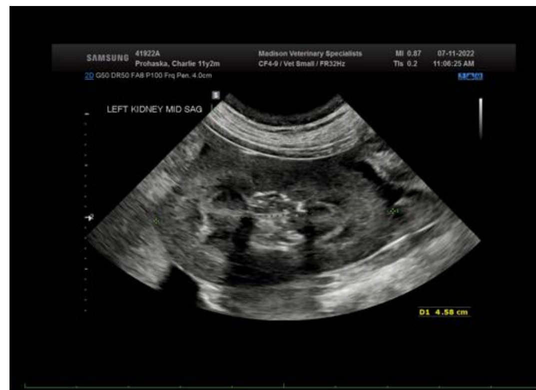

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Thank you for this referral. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance please contact me.

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