

**DATE**

3/2/22

**PRESENTING CLINICAL SIGNS**

Had dental surgery at ADC for numerous retained deciduous teeth at end of Jan. On pre-anesthetic labs from AD was seen to have elevated liver enzymes and mildly low albumin. Post op, has seemed painful, inappetent, and episodic dark to tarry melanotic stools reported. O also reported smelly urine- UA showed hematuria and bacteruria. Started on oral antibiotics but didn't tolerate, gave Convenia injection. Improved after IV fluids, Cerenia and Sucralfate admin on 2/5/22. O discontinued Sucralfate as seemed to be doing better and eating better. Starting on 2/13/22- painful- will jump up, pace, cry out and assume "prayer pose" and have abdominal component to breathing. Seen at ER on 2/14 early AM- found NSF on exam and prescribed Gabapentin. No improvement, so recheck here today. 2/24/22 PE was stable. No pain appreciated by clinician. Stable weight 10.7lbs.

**PATIENT**

Denim Millar

**SPECIES**

Canine

**BREED**

Yorkie Mix

**SEX**

Intact male

**AGE**

6/18/21

**WEIGHT**

10.5 lbs

**INTERPRETED BY**Eric Lindquist, DMV  
DABVP, Cert. IVUSS**HOSPITAL NAME**

Paradise AH

**REFERRING VET**

Dr. Riehl

**INVOICE**

96548

Current Medications: Restarting Gabapentin 50mg q 8-12 hours and Buprenex 0.15mg sublingual q 8-12 hours 2/15 mid day. Convenia 4.5mg IV on 2/15 mid day. Sucralfate 1/2g in slurry TID starting 2/15 mid day. Currently: Codeine 15mg- ¼ q 8-12 hours PRN for abdominal pain. Finished Amoxicillin trial (in case of HE). Attempted Lactulose trial but owner felt was crampy so was discontinued. Entyce SID.

Lab Results: Persistent mod hypoalbuminemia (1.9), low BUN (3), elevated ALT (133) and ALT (252)- - concern for poss hepatic shunt. Prev hematuria resolved as of 2/15/22. Bile Acids obtained 2/16/22: pre-prandial 28.9 (0-14.9), Post-prandial 272.1 (0-29.9). No other BW rechecked to conserve costs.

Radiographs: On 2/15 show no obvious obstructive pattern, ingesta in stomach, kidneys look "plump" but no visible mineralization or stones seen.

Date of Previous IntraPet Ultrasound: No previous.

Sedation: IV propofol.

Stat Report: Not requested.

Imaging Performed By: Andi Parkinson, RDMS.

**ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN****Urinary System**

The **urinary bladder**, trigone, and pelvic urethra presented normal thicknesses and normal tone. 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 was noted. Ureteral papillae were normal.

The **kidneys** are normal in contour and subjectively slightly swollen, yet there are no calculi noted. The left kidney measured 4.9 cm and the right kidney measured 5.0 cm.

**Adrenal Glands**

The **adrenal glands** were slightly subnormal in width, yet distinctly hypoechoic to the surrounding fat. The left adrenal gland measured 1.84 x 0.34 cm at the caudal pole and 0.32 cm at the cranial pole. The right adrenal gland measured 1.68 x 0.37 cm at the caudal pole and 0.27 cm at the cranial pole.

**Spleen**

The **spleen** presented a smooth homogeneous parenchyma hyperechoic to liver and renal cortical parenchyma. The capsule was smooth without noticeable expansion or deviation from within the spleen or adjacent pathology. The splenic vasculature demonstrated normal volume without signs of congestion or thrombosis. No sonographic evidence of acute or chronic inflammatory, neoplastic, or infarctual changes was noted.

**Liver**

The **liver** presented diffuse parenchymal remodeling with increased portal markings in addition to subnormal size. The liver was subnormal in size in short axis measuring 1.8 cm. The portal vein was followed to all of its branching. The right branch appeared to be very short owing to the lack of development of the right liver, yet was visible. The portal vein volume was normal at the branching. The portal vein measured 0.75 cm, vena cava measured 0.51 cm and the aorta measured 0.58 cm. There is no evidence of extrahepatic shunting or portal hypertension as there is forward velocity in the portal vein was approximately 23-24 cm/sec. The intrahepatic vasculature appeared to have adequate volume; however, tortuosity was noted with some of the branches of the hepatic veins. The vena cava volume was normal as it traversed the diaphragm. A tortuous intrahepatic vessel was noted in this patient and measured 0.3 cm in width and appeared to have a connection with the vena cava. It appeared to be deriving from the central or left branch of the portal vein. The gallbladder presented a slight amount of sand or possible gas accumulation. Radiographs should be assessed.

### ***Gastrointestinal***

The **stomach** was over distended with anechoic fluid. The small intestines and colon were unremarkable. Epigastric lymph node was reactive and measured 0.73 x 0.5 cm.

### ***Pancreas***

The **pancreas** was distinctly hypoechoic to the surrounding fat.

## **ULTRASONOGRAPHIC FINDINGS**

- Severe microhepatica with remodeling. Lack of extrahepatic shunting. Intrahepatic shunting is possible, yet it may be secondary owing to diffuse parenchymal disease.
- Slight gallbladder sand or possible gas accumulation.
- Subnormal adrenal size.
- Subjectively swollen kidneys.

## **INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

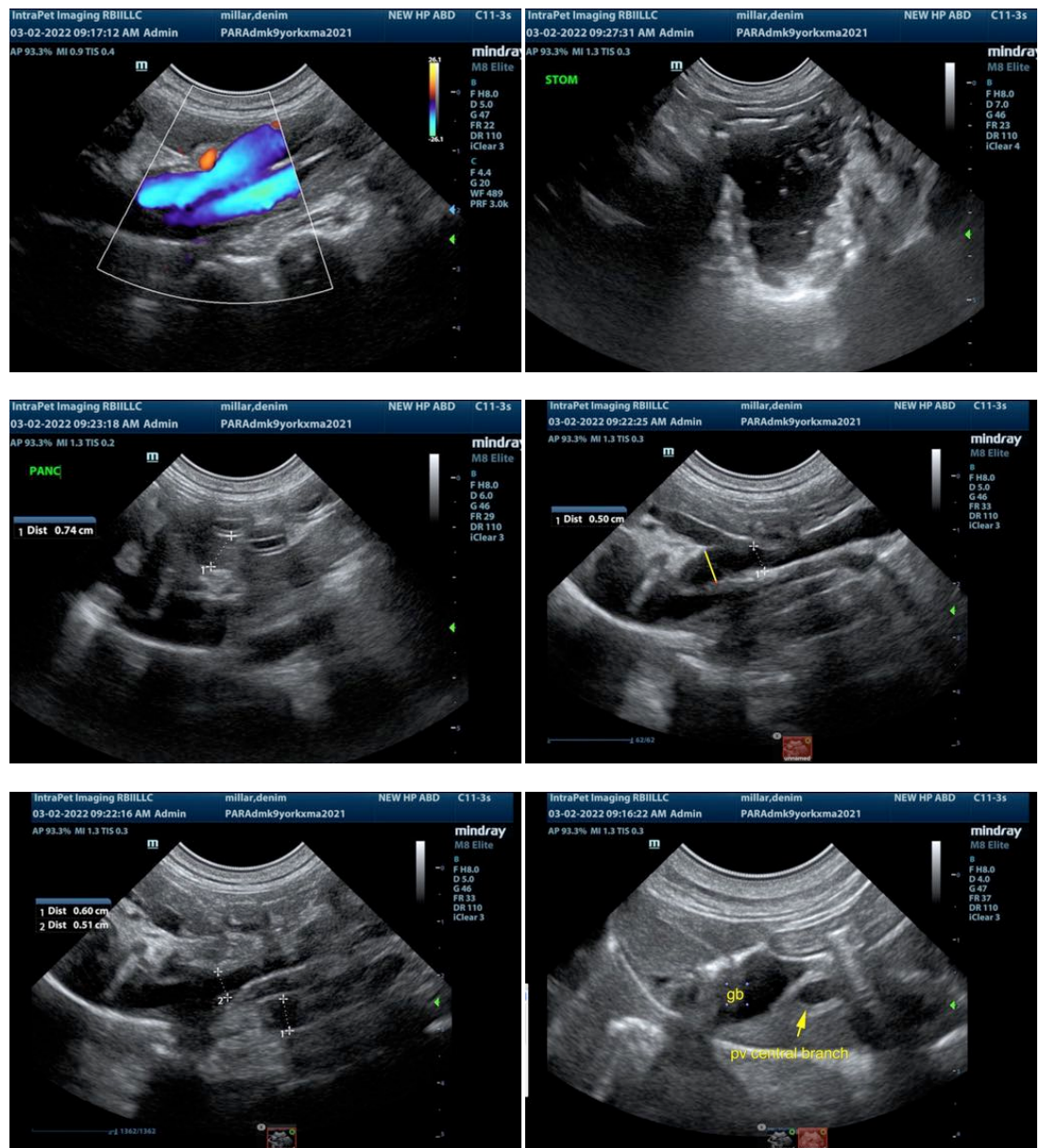
I recommend medical management for impending liver failure in this patient. Screening for concurrent congenital Addison's is also warranted to ensure that it is not a complicating factor given the subnormal adrenal size and low albumin. However, the low BUN, low albumin as well as the elevated bile acids render a very guarded prognosis for this patient.

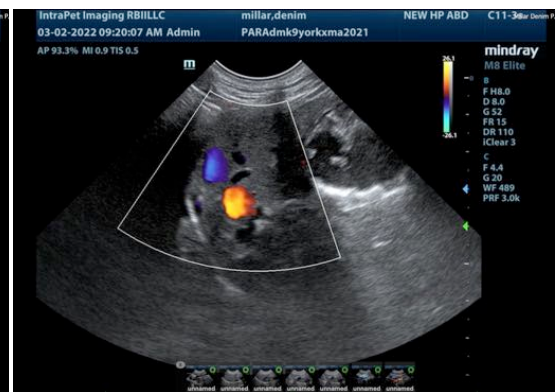
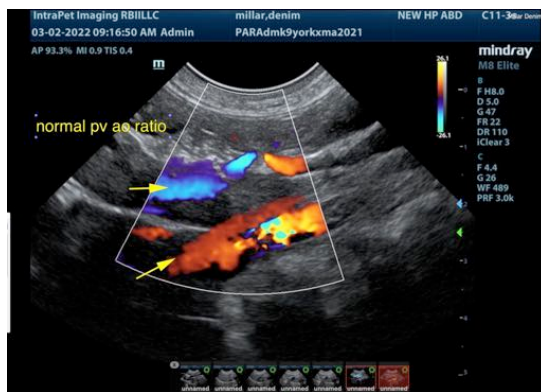
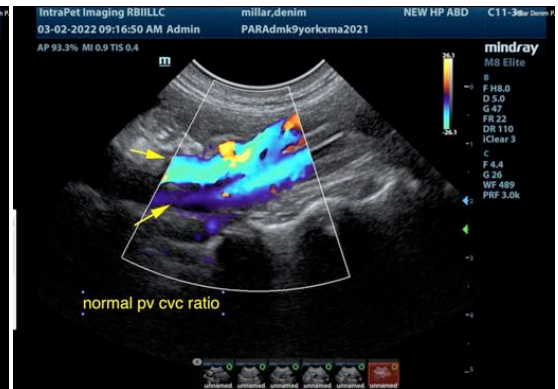
I recommend the following protocol as well as baseline cortisol to rule out a congenital Addison's complicating the presentation; however, this is not overtly suspected. CT with contrast would be warranted for further definition of the intrahepatic vasculature. Hepatic biopsy would be the next step; however, this would likely necessitate laparoscopy or surgical approach given the small size of the liver and the irregular tortuous intrahepatic vessels. There is a potential for central divisional intrahepatic shunt. However, this is an odd hepatic parenchymal presentation and would necessitate further definition by CT with contrast. Depending upon CT with contrast findings referral for vascular occluder treatment could be considered. However, there is significant parenchymal disease in this patient. Therefore, strict medical management is warranted. The prognosis is extremely guarded.

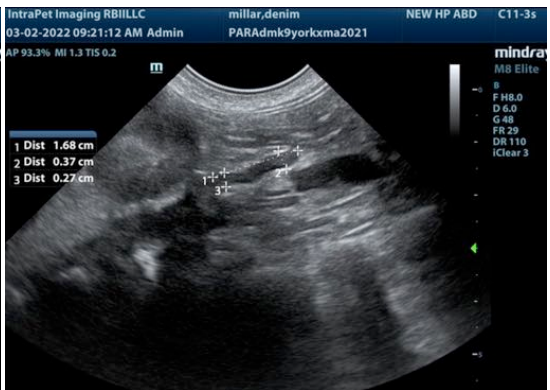
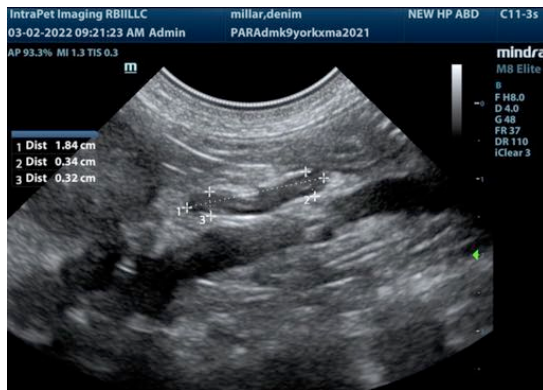
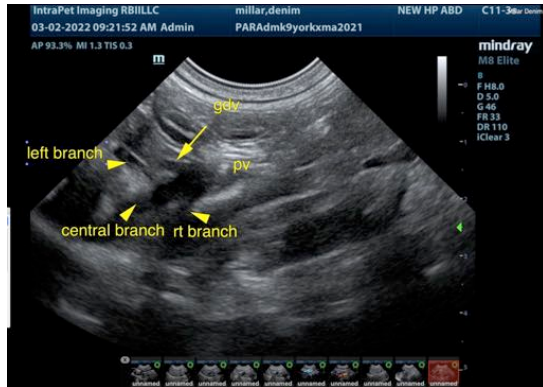
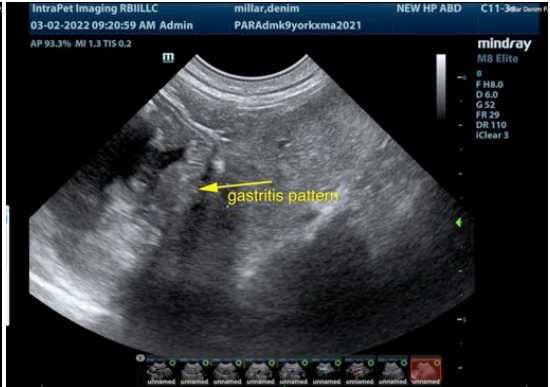
### **Hepatic Support for Bile Acid Elevation +/- Hepatic Encephalopathy**

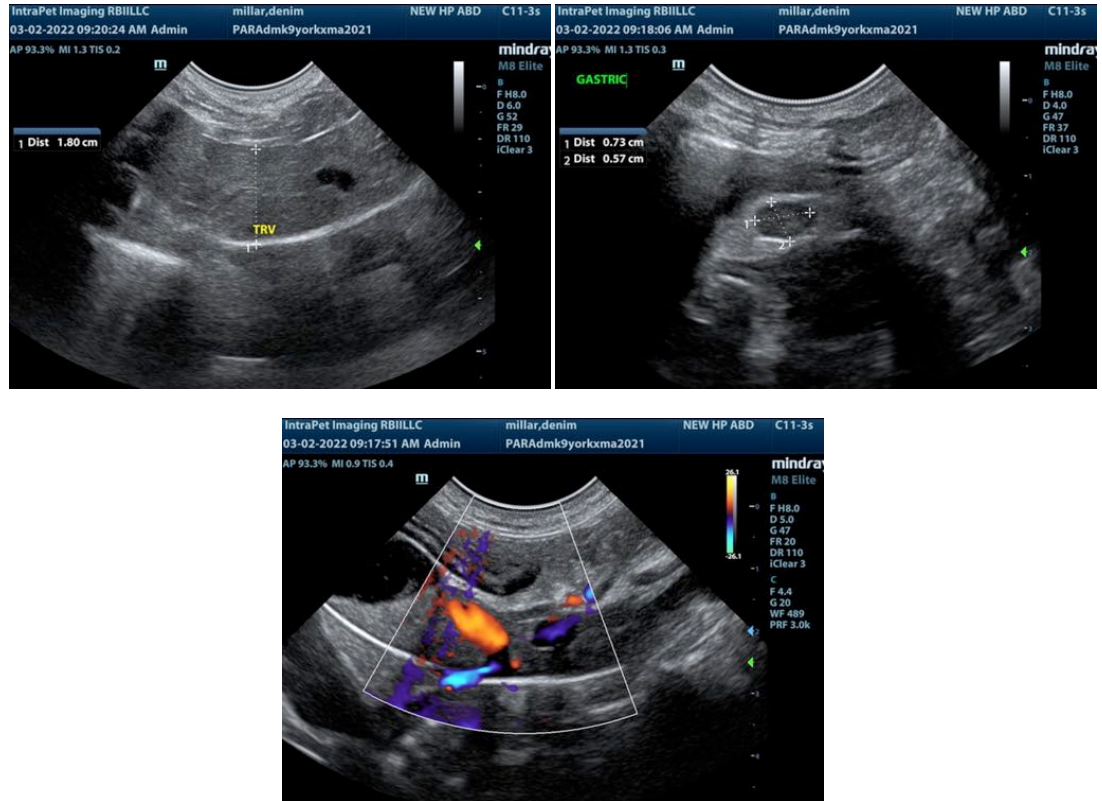
**Royal Canin Hepatic Support diet or Hills L/D, Metronidazole (7.5 mg/kg PO bid) over the next 14 days,**

Lactulose (Oral: 3.1-3.7 g/5 ml lactulose in a syrup base) long term to target 2-3 soft stools/day, with a **high-quality protein supplement** of minor amount of **yogurt** or **cheddar cheese**. Monitor bile acids, with attention paid to dropping albumin, BUN or cholesterol. **SAME** and nutraceuticals as needed. **Ursodiol** (10-15 mg/kg p.o. q24h) can be considered as hepatoprotectant and to enhance bile flow. **Zinc** serum level keep between 200–500 ug/dl. If deficient then Tx zinc acetate 1-3 mg/kg/day. Gastrointestinal protectants are recommended if the patient is anorexic.









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.

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