



**PATIENT**

Bunny Davis

**SPECIES**

Canine

**BREED**

Yorkie Poo

**SEX**

Null

**AGE**

1 ½ years

**WEIGHT**

10.5 lbs

**INTERPRETED BY**

Eric Lindquist, DMV  
DABVP, Cert. IVUSS

**IMAGING PERFORMED BY**

Andrea Nicastro, DVM,  
DACVIM

**HOSPITAL NAME**

Central VH

**REFERRING VET**

Dr. Reynolds

**INVOICE**

43616

**DATE**

3/29/23

**PRESENTING CLINICAL SIGNS**

History: Previous shunt and surgery. increase in liver enzymes Splenocaval shunt with a "fork"; ameroid placed

Abnormal PE/Chem/CBC/UA Results: last bile acids 2/24/23: Pre 220.4 Post 228.3 - bile acids are rising

**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. The bladder revealed minor calculi and a slight amount of sand. The group of sand measured 3.0 mm. No evidence of inflammatory or neoplastic changes was noted. Ureteral papillae were normal.

The **kidneys** in this patient were mildly swollen with multi-focal, pelvic and corticomedullary calculi that were non-obstructive at the time of the sonogram. The left kidney measured 3.8 cm. The right kidney measured 3.94 cm.

**Adrenal Glands**

Both **adrenal glands** were visualized and recognized as having normal shape, size, position and echogenicity for this breed. The phrenic vasculature, glandular echogenicity and detail were unremarkable. Capsule, cortex, and medullary definition were normal for this age patient. The right adrenal measured 0.69 cm at the cranial pole. The left adrenal gland measured 0.29 cm at the cranial pole and 0.26 cm at the caudal 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** was subnormal in size and subjectively subnormal in vascularity. Parenchymal echogenicity was naturally coarse and hypoechoic to the spleen. The hepatic vein revealed normal to subnormal flow into the vena cava. The portal vein was persistently subnormal in size with mildly enlarged vena cava. A 0.4 cm portal vein, 0.75 cm vena cava and 0.6 cm aorta were noted. This would suggest excessive volume into the vena cava. One view revealed a potential, residual, low-grade flow into the vena cava entering dorsally just caudal to the portal hilus, which is a typical position for a residual splenocaval flow. However, this would need to be confirmed by CT. Given that the extrahepatic shunt correction was reported to be forked, residual auxiliary flow may be playing a role. The gallbladder presented acceptably thin walls with primarily anechoic content. The cystic and common bile ducts were normal.



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**Gastrointestinal**

The **gastric** wall was slightly thickened. The lumen was empty. The intestines were free of stasis, of normal wall thickness, acceptable curvilinear mural detail, and peristaltic activity. Small and large intestine demonstrated normal luminal chyme and stool consistency respectively. No obstructive or overt infiltrative disease was noted. No associated abnormal lymphatic activity was noted.

**Pancreas**

The base and limbs of the **pancreas** were observed to be largely isoechoic to surrounding omental fat. Pancreatic duct and capsular contour were acceptably normal and parenchyma respected normal curvilinear patterns. No overt evidence of active inflammatory or neoplastic disease was noted.

**ULTRASONOGRAPHIC FINDINGS**

- Microhepatica.
- Mild, persistent, subnormal portal vein and intrahepatic vascular volume. Slightly enlarged vena cava. Potential residual shunt flow +/- concurrent parenchymal disease such as portal hypoplasia/microvascular dysplasia.
- Swollen kidneys with non-obstructive nephrolithiasis.
- Small bladder calculi, non-obstructive and bladder sand
- Mild gastritis pattern.

**INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

I recommend repeat CT with contrast to assess for any residual shunt flow post correction. Evaluation of liver biopsies are recommended to assess for concurrent portal hypoplasia/microvascular dysplasia that may be playing a role in the elevated bile acids. This patient will likely continue to produce calculi given the abnormal ammonium metabolism. In the meantime, the following protocol or similar is recommended with GI protectants to treat for potential underlying gastritis. There was no evidence of portal hypertension and no evidence of pancreatic edema or congestion in the gastroduodenal vein.

**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.



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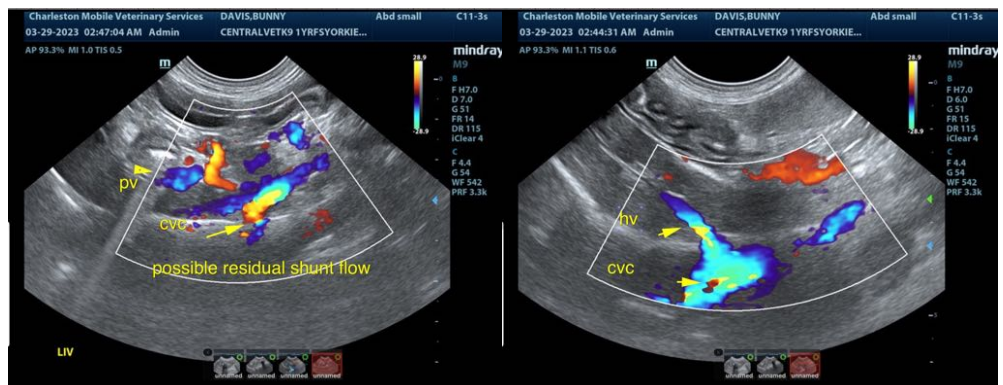
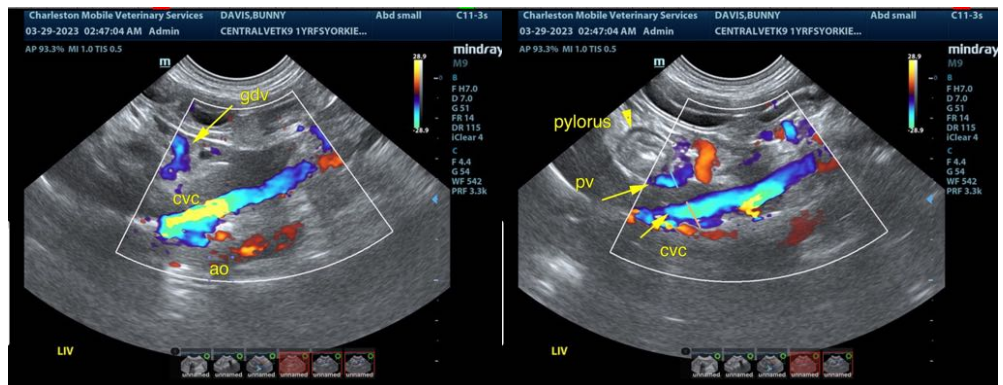
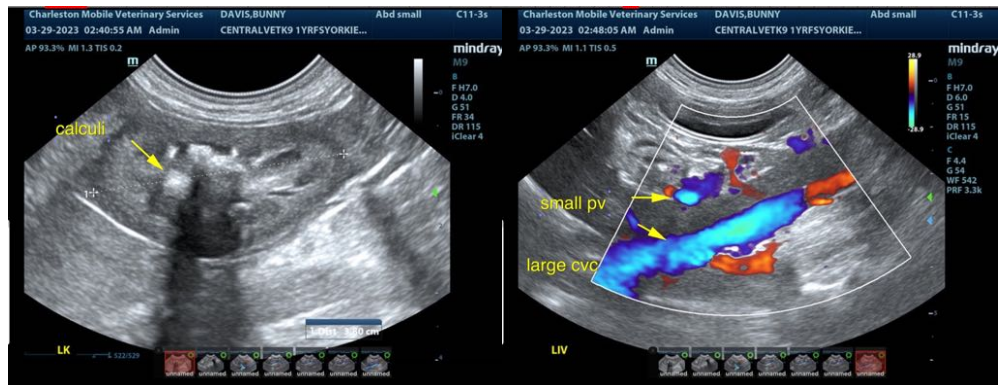
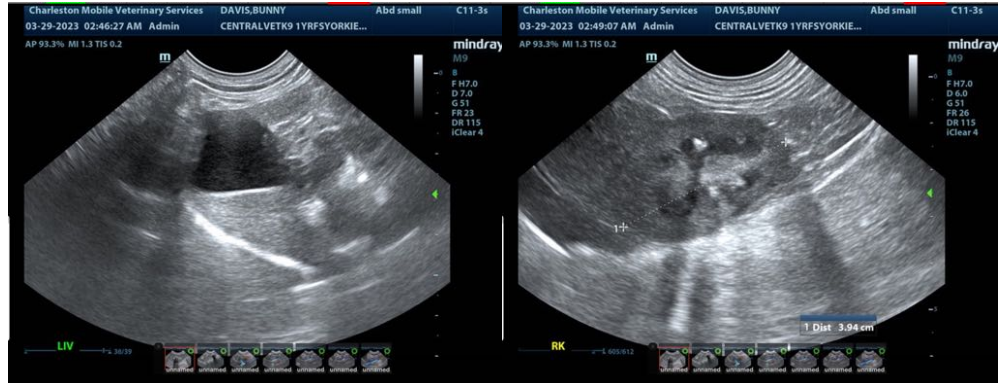
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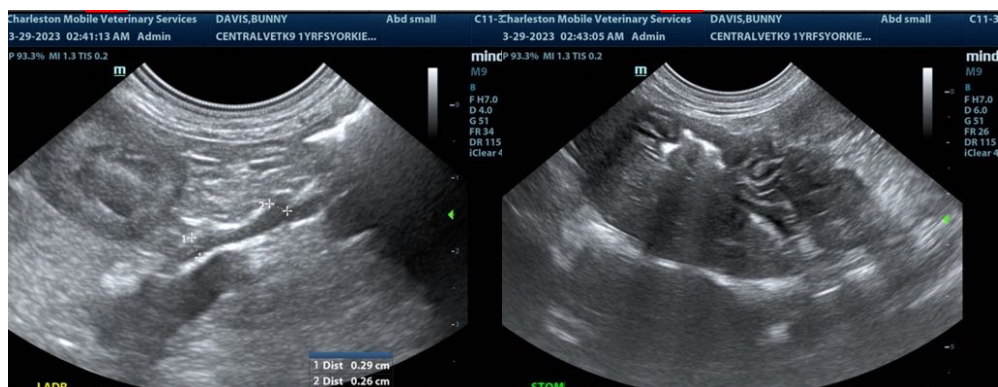
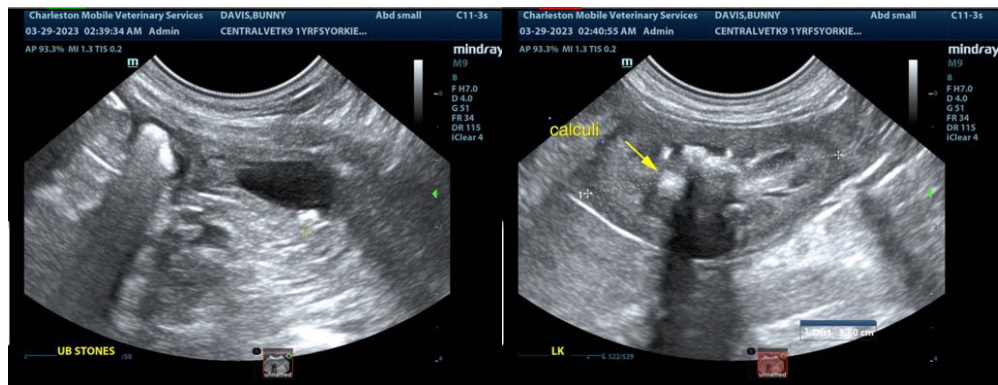
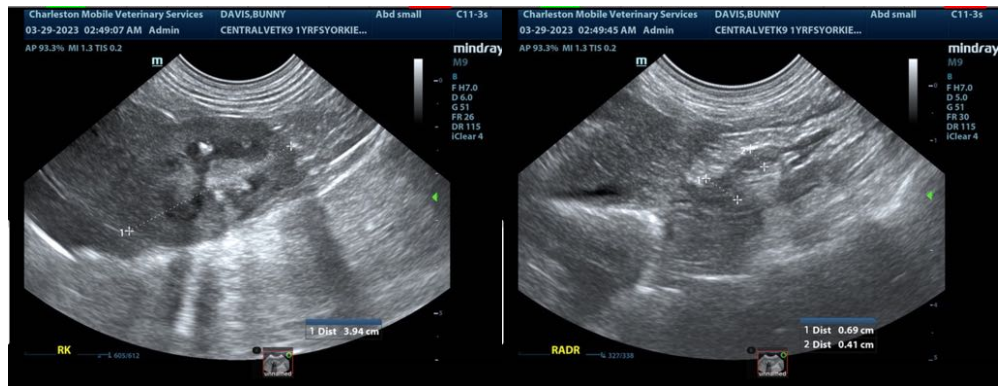
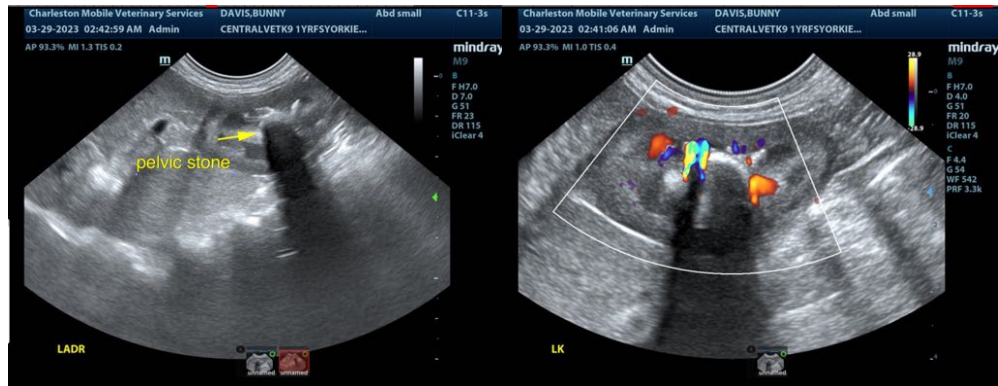
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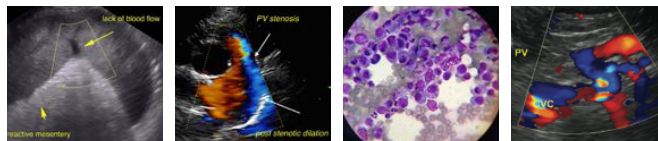
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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Eric Lindquist, DMV, DABVP, Cert. IVUSS, CEO of SonoPath.com  
info@SonoPath.com