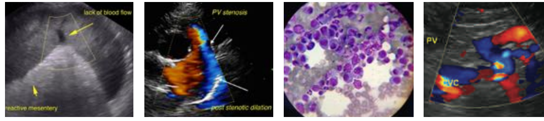


PATIENT
Ruby Tipsword

SPECIES
Canine

BREED
Boxer

SEX
Female

AGE
6 months

WEIGHT
38.4 lbs

INTERPRETED BY
Eric Lindquist, DMV, DABVP, Cert. IVUSS

IMAGING PERFORMED BY
Jenna Walsh, CVT

HOSPITAL NAME
Santa Clara AH

REFERRING VET
Dr. Zulauf

DATE
10/18/21

Invoice
92438

PRESENTING CLINICAL SIGNS

History: Large amount of ascites noted during spay procedure (procedure canceled at that time)
Primary Question/Differential to Be Answered in This Exam R/O liver shunt
Abnormal PE/Chem/CBC/UA Results: - ALB 2.1 (all other values on chem 10 wnl) - abdominal fluid analysis - MICROSCOPIC DESCRIPTION: Prepared smears of fluid collected by abdominocentesis are of low to moderate cellularity and are minimally hemodiluted. Smears contain a mixed population of inflammatory leukocytes, and few erythrocytes. Inflammatory leukocytes include 37% nondegenerate neutrophils, 46% large mononuclear cells/macrophages, and 17% small lymphocytes. Rare macrophages contain phagocytized erythrocytes. Infectious organisms are not identified. - MICROSCOPIC INTERPRETATION: transudate - bile acids: pre - 23.4, post - 105.1

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. A large amount of suspended and dependent debris was noted. No evidence of inflammatory or neoplastic changes was noted. Ureteral papillae were normal.

The **kidneys** were both swollen and slightly irregular in contour. Minor, pyelectasia was noted. Isoechoic, nodular cortices were noted in the kidneys. The left kidney measured 5.23 cm. The right kidney measured 8.88 cm.

Adrenal Glands

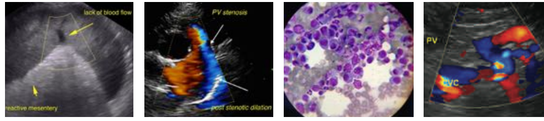
Both **adrenal glands** were visualized and recognized as having normal shape, size, position and echogenicity for this breed. The phrenic vasculature, glandular echogenicity and detail were unremarkable. Capsule, cortex, and medullary definition were normal for this age patient. The right adrenal gland measured 1.36 x 0.45 cm at the cranial pole and 0.33 cm at the caudal pole. The left adrenal gland measured 3.4 x 0.8 cm at the caudal pole and 0.61 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** revealed mildly coarse architecture with slight, irregular contour with normal right-sided liver size and subjectively subnormal left liver size. Intrahepatic views did not reveal any overt intrahepatic shunting. Hepatic vein inflow into the vena cava appeared normal. The portal vein to vena cava ratio was



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relatively normal at 0.9 cm. The portal vein measured 0.8 cm and the vena cava at the level of the portal hilus measured 0.9 cm. Vena cava to aortic ratio was normal. The gallbladder presented acceptably thin walls with primarily anechoic content. The cystic and common bile ducts were normal. No pathological hepatic lymphadenopathy was evident.

Gastrointestinal

Examination of the **gastrointestinal tract** revealed a stomach and intestine 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

Pancreatic edema was noted.

Free Abdomen

Free fluid was noted in the abdomen.

ULTRASONOGRAPHIC FINDINGS

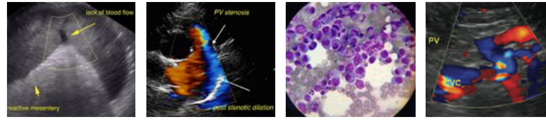
Free fluid in abdomen with pancreatic edema.

Swollen kidneys with loss of corticomedullary definition, nodular cortical changes and pyelonephritis pattern.

Bladder debris.

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

There is no overt evidence of portosystemic shunting. However, I cannot explain the free fluid and swollen kidneys unless underlying urinary tract infection is playing a role. Acute insult such as toxin exposure such as mushroom toxicity or Leptospirosis should be considered. CT of the abdomen would be ideal in this patient. I cannot completely rule out portosystemic shunting. However, all the typical macroscopic portosystemic shunt regions were imaged. Left gastric vein entry into the portal vein was normal. Inflammatory event involving the liver causing secondary portal hypertension is a possibility in this patient. Leptospirosis titers and full urine culture and sensitivity is recommended. Concurrent primary renal dysplasia is also a potential in this case. Portal hypoplasia/microvascular dysplasia may also be responsible for the bile acid elevations. This is an exceedingly complex case. However, the kidneys are definitively enlarged and abnormal, which would support either infection/pyelonephritis and/or abnormal urate metabolism driving renomegaly. No urinary calculi were noted at the time of the sonogram. The free fluid is somewhat perplexing in that the portal vein is not excessively enlarged and therefore portal hypertension is less probable. Eventual liver biopsy and exploratory surgery may be an option in this patient after further diagnostics. An abdominal CT is strongly recommended as well as



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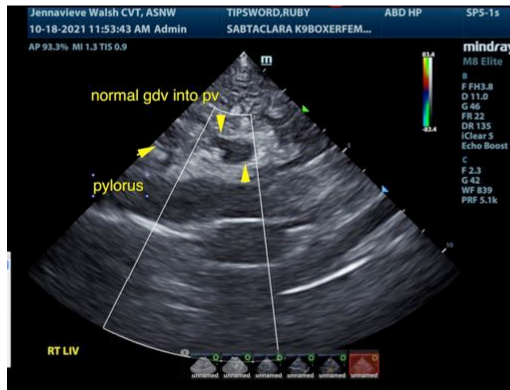
medical therapy for liver support and treatment for any evidence of urinary tract infection.

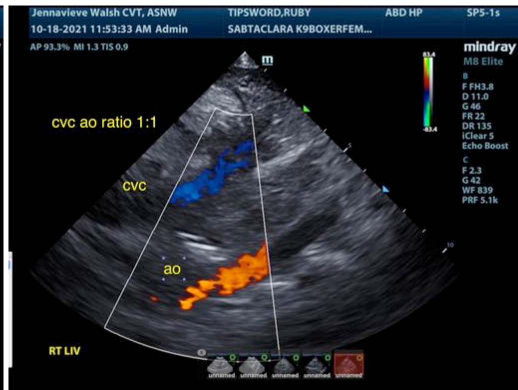
Hepatic Support for Bile Acid Elevation +/- Hepatic Encephalopathy

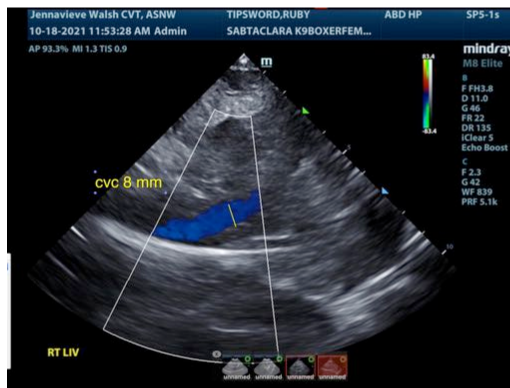
Royal Canin Hepatic Support diet or Hills L/D, **Metronidazole** (7.5 mg/kg PO bid) over the next 14 days, **Lactulose** (Oral: 3.1-3.7 g/5 ml lactulose in a syrup base) long term to target 2-3 soft stools/day, with a **high-quality protein supplement** of minor amount of **yogurt** or **cheddar cheese**. 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.

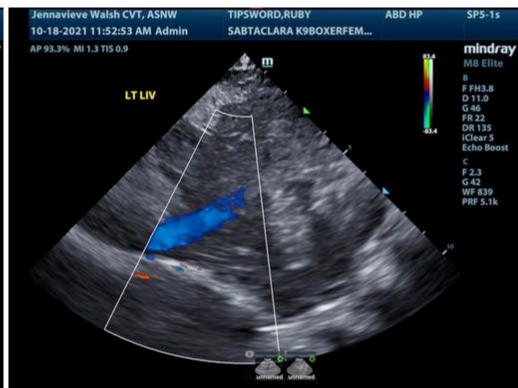
For an additional charge an internal medicine consult can be utilized through Sonopath.com. You can select the internal medicine drop down at http://spa.sonopath.com/.

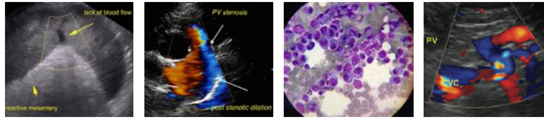
One of the world's top internists & SonoPath associate Dr. Remo Lobetti BVSc, MMedVet, PhD, DECVIM can evaluate your case through SonoPath. https://sonopath.com/resources/sonopath-services/internal-medicine-teleconsultation-services











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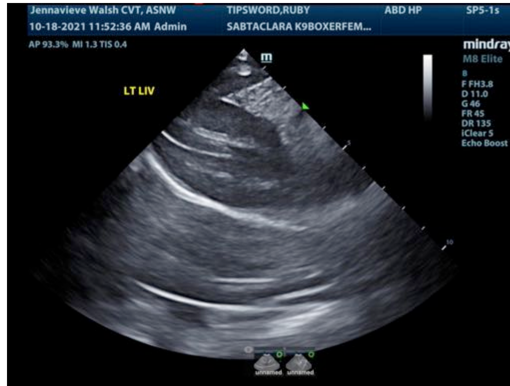

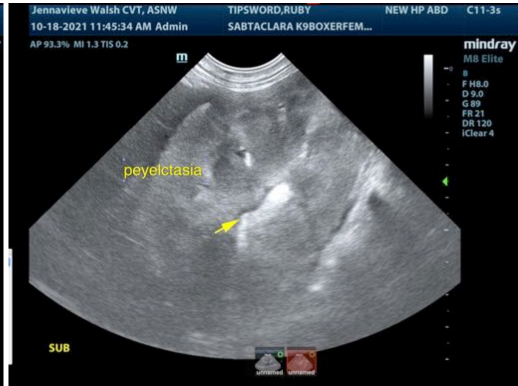

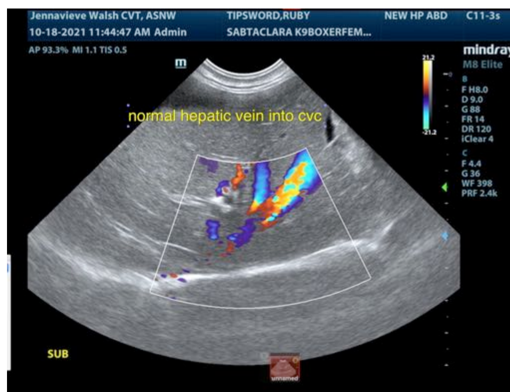

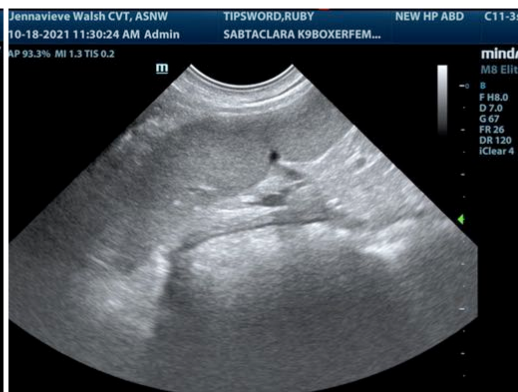

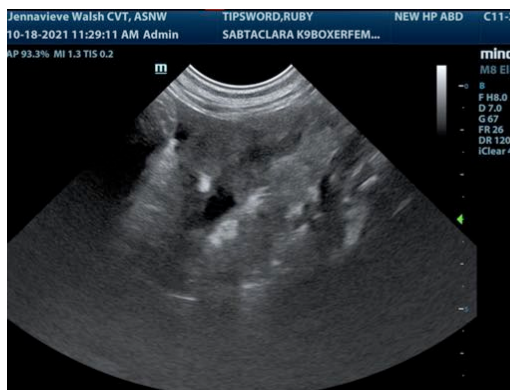

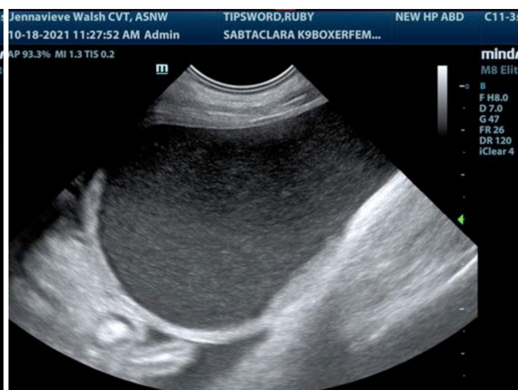

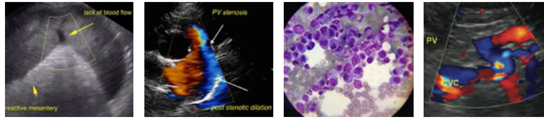

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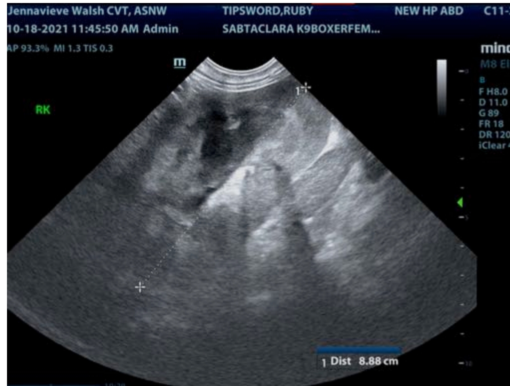
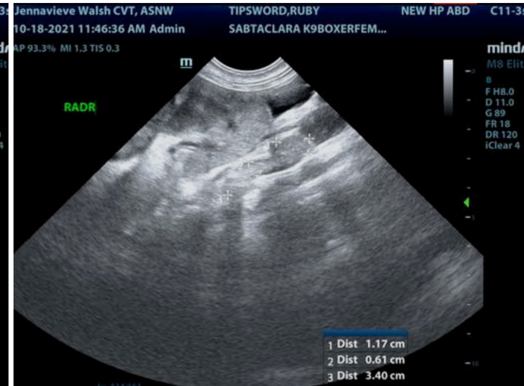
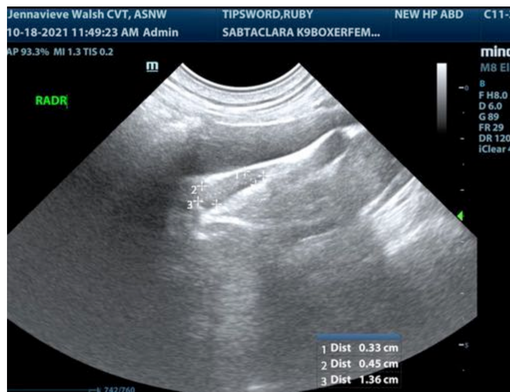
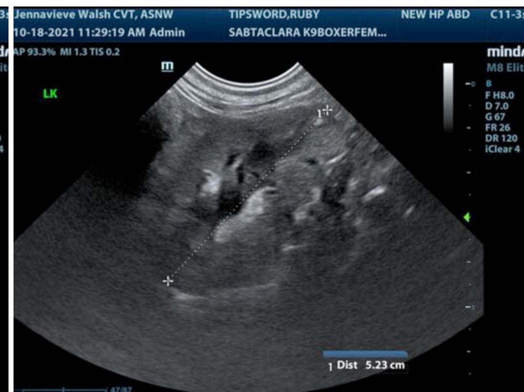
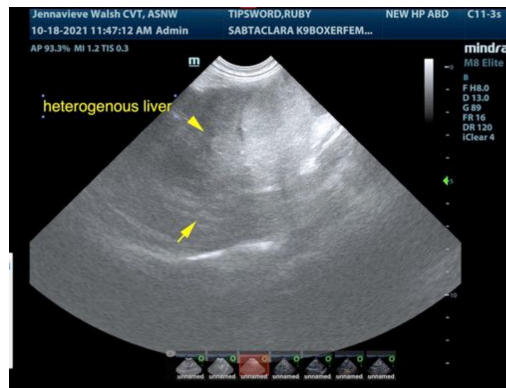








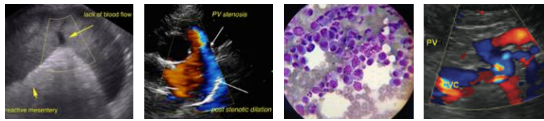


The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Eric Lindquist, DMV, DABVP, Cert. IVUSS

CEO of Sonopath.com



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