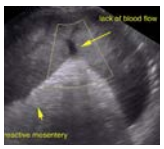
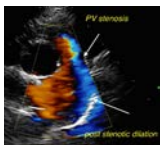
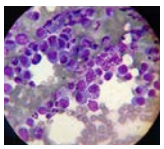
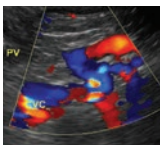

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PATIENT
Roxy Boehm

SPECIES
Canine

BREED
Lab X

SEX
Spayed Female

AGE
13 Years

WEIGHT
80.5 Pounds

INTERPRETED BY
Lisa Carioto, DVM, DVSc, Diplomate ACVIM

IMAGING PERFORMED BY
Diane McFadden

HOSPITAL NAME
Mt. Olive VH

REFERRING VET
Dr. Jones

INVOICE
39778

DATE
7/22/22

PRESENTING CLINICAL SIGNS

elevated liver values, asymptomatic. On vetprofen, clindamycin, neopolybac opthalmic ointment
Abnormal PE/Chem/CBC/UA Results: ALKP 1021, BUN/crea ratio 34

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The **urinary bladder** is well distended with anechoic contents. The wall is smooth and regular. No abnormalities are noted with the trigone or proximal urethra, and there is no evidence of sediment, cystoliths, polyps or a mass.

Kidneys

The **left** kidney measures 7.14 cm. The capsule is smooth. A mild loss of the normal definition of the cortico-medullary junction is present. A well-defined hyperechoic cortical lesion is noted at the cranial pole, which is suggestive of an infarct. Dorsal to the former is an elongated, anechoic structure within the cortex, which is most consistent with a benign cyst. Mineralizations of the diverticulae and pelvis are present, without evidence of nephroliths or pyelectasia. Blood flow is within normal limits. The surrounding mesentery is not hyperechoic.

The **right** kidney measures 7.27 cm. The capsule is smooth. A mild loss of the normal definition of the cortico-medullary junction is present. A mild loss of the normal definition of the cortico-medullary junction is present. Mineralizations of the diverticulae and pelvis are noted, in addition to two small nephroliths (4.5 mm and 6.5 mm). There is no evidence of pyelectasia. Blood flow is within normal limits. The surrounding mesentery is not hyperechoic.

Aortic bifurcation/trifurcation No abnormalities observed.

Adrenal Glands

The **left** adrenal gland measures between 0.70 cm at the cranial pole, 0.64 cm at the caudal pole and 2.67 cm in length. No abnormalities are noted with the gland's overall architecture, echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

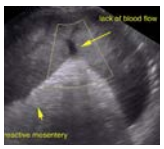
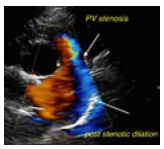
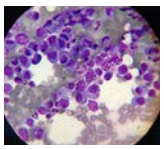
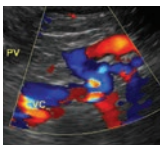
The **right** adrenal gland measures 1.09 cm at the cranial pole, 0.95 cm at the caudal pole and 2.83 cm in length. No abnormalities are noted with the gland's echogenicity or echotexture. The phrenico-abdominal vein and surrounding vasculature and mesentery are unremarkable.

Spleen

The spleen is within normal limits in size, architecture, echotexture, and echogenicity. The capsule is smooth. No abnormalities are observed with its vasculature, i.e. congestion and thrombi are not identified.

Liver (36.6 kg, 15 cm depth)

There are no obvious signs of hepatomegaly, however, hepatic size is better characterized at the time of the ultrasound or radiographically. The liver's borders are smooth and vary between sharp to very mildly rounded. The portions of the liver visualized are heterogeneous with a diffuse coarse or granular echotexture, in addition to multiple hypoechoic nodules of various sizes scattered throughout the parenchyma. The largest measures 3.69 cm in diameter x 6.59 cm in length. The surrounding parenchyma is mildly to moderately hyperechoic. The right liver is slightly less heterogeneous. It is

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within normal limits in echogenicity, i.e., it is hypoechoic to the spleen. No obvious abnormalities are noted with the hepatic vessels.

The **gallbladder** (GB) is mildly dilated (consistent with a fasted individual). A small to moderate amount of gravity-dependent of echogenic material is noted within the GB. Multiple well-defined structures are visualized within the GB. The sludge and the latter cast acoustic shadows, consistent with choleliths. The gallbladder wall is within normal limits in thickness and echogenicity. The proximal portion of the cystic duct is within normal limits. The remainder of the cystic and common bile ducts are not observed, however, there are no signs of an obstruction.

Gastrointestinal

A very small amount of gas and liquid are present within the lumen of the stomach. The gastric wall is within normal limits in thickness and the wall layers are well defined. No obvious abnormalities are observed with its peristalsis.

Duodenum: It is mildly thickened (0.63 cm), with fogging of the mucosa.

Jejunum: A large amount of gas and fluid are present within the lumen of the small intestines, however, no abnormalities are noted with peristalsis. Measurements are within normal limits, however, one segment is thickened and has a thickened mucosa with fogging. Although the definition of the wall layers of the jejunum is preserved, multiple segments show mucosal fogging, while others show both mucosal fogging and a prominent submucosa. Abnormally dilated loops of bowel are not observed.

The transverse colon and descending colon: The wall is not thickened and mural detail is considered normal. Formed stools are present within the colon.

Pancreas

The pancreas has a mildly coarse echotexture, and is mildly heterogeneous. It consists of hypoechoic nodules of variable size and pinpoint to punctate hyperechoic foci scattered throughout the parenchyma. These changes are suggestive of nodular hyperplasia and fibrosis, respectively. Fibrosis may be an age-related change, secondary to previous episodes of pancreatitis, mineralization and amyloid deposition. Signs of active pancreatitis or neoplasia are not appreciated.

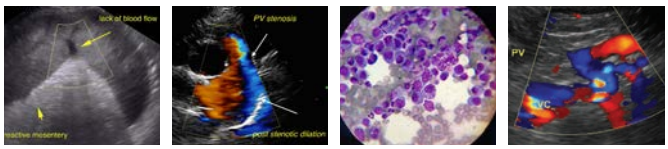
Other

Lymph nodes No abnormalities are observed

Abdominal effusion is not visualized.

ULTRASONOGRAPHIC FINDINGS

- **Liver**: Despite the large size of a few of the nodules, nodular hyperplasia and regeneration, both of which are benign, are suspected. A reactive hepatopathy could explain the mildly coarse or granular echotexture. Obvious signs of neoplasia ("target-like" lesions) are not visualized.
- **Gallbladder**: Gallbladder sludge with multiple choleliths. There is no evidence of obstructive disease. Obtaining a history from the client regarding signs of gastroesophageal reflux disease (GERD) is suggested. Treatment with an anti-acid, proton pump inhibitor or ursodeoxycholic acid may be required.
- **Kidneys**: Age-related degenerative changes, mineralizations and a couple of small nephroliths, without signs of obstruction. Sonographic signs of pyelonephritis are not observed.



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- **Adrenal glands**: Both poles of the right adrenal gland are enlarged, however, an obvious mass or nodule is not visualized. This may be a variation of normal or due to hyperplasia secondary to stress (chronic illness). Hyperplasia due to pituitary dependent hyperadrenocorticism (HAC) is considered unlikely, but should be correlated with clinical signs. i.e., further diagnostics are not necessary if a patient is not demonstrating clinical signs of HAC. An evaluation of Roxy's arterial blood pressure and a urine protein: creatinine ratio are suggested (see below).

- **Pancreas**: Age-related changes, however, previous episodes of pancreatitis cannot be excluded. Signs of active pancreatitis or neoplasia are not appreciated.

- **Gastrointestinal tract**: Non-specific inflammatory changes, possibly due to an underlying chronic enteropathy, e.g., inflammatory bowel disease, food intolerance, etc. Irritation secondary to NSAIDs cannot be ruled out.

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Further diagnostics, such as a low-dose dexamethasone suppression test or an ACTH stimulation test, are *not* necessary at the moment as Roxy is not demonstrating clinical signs of HAC. However, a urine protein: creatinine (UPC) ratio and an arterial blood pressure are recommended. If proteinuria or hypertension is present, further work up for hyperadrenocorticism is warranted, as treatment of either of these signs is suggested, even if overt clinical signs of HAC are not evident.

A baseline GGT enzyme activity is suggested (GB sludge and choleliths).

Obtaining a history from the client regarding signs of gastroesophageal reflux disease (GERD), as well as other GI signs, including pica, is suggested. Treatment with an anti-acid, proton pump inhibitor may be required.

The use of ursodeoxycholic acid (Ursodiol) may be considered, however, it should not be started concurrently with the other medications. Furthermore, it should be administered judiciously, at a very low dose, and slowly up-titrate to decrease the risk of GI side effects. For example, 3 mg/kg PO once a day for 5-7 days, then 5 mg/kg PO once a day for 5-7 days, then 7.5 mg/kg PO once a day for 5-7 days, then 10 mg/kg PO once a day for 5-7 days. Roxy may not be able to tolerate the 15 mg/kg/day dose. Also, the dose should be *divided BID* and given *with a meal* to decrease the risk of nausea, cramps, vomiting and diarrhea.

Recheck ultrasound 3-4 months following initiation of medication to assess response to therapy.

Urinalysis (urine specific gravity), UPC ratio (as above)

Arterial blood pressure, in presence of client

Adjunct therapy for osteoarthritis to minimize need for/dose of NSAIDs (GI changes noted), e.g., diet, natural supplements containing curcumin, omega-3 fatty acids, glucosamine chondroitin, collagen, etc., Cartrophen, gabapentin, laser therapy, acupuncture, swimming, etc.

A re-evaluation of liver enzyme activities, including a GGT, is suggested 6-8 weeks after initiation of Ursodiol. If the ALT is implicated, a liver biopsy with measurement of (tissue) copper concentrations, is suggested (copper hepatopathy of the Labrador retriever).

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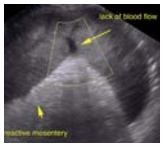
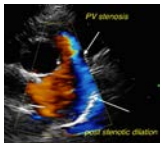
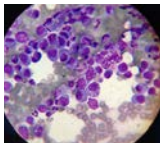
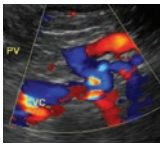

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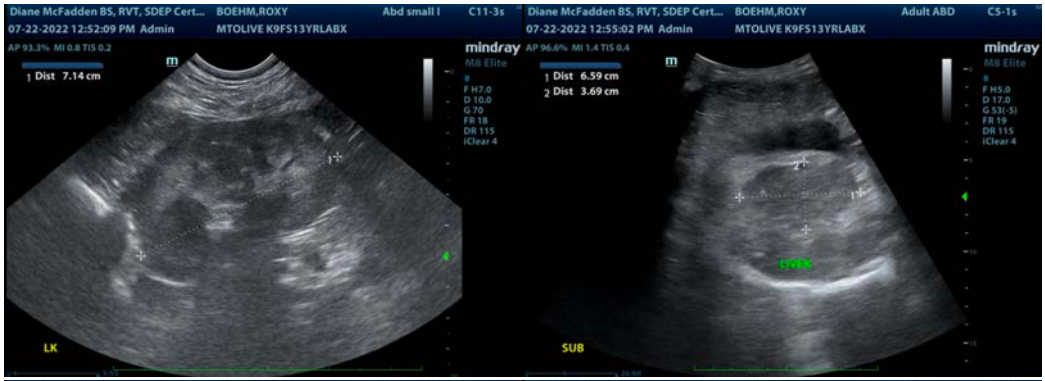

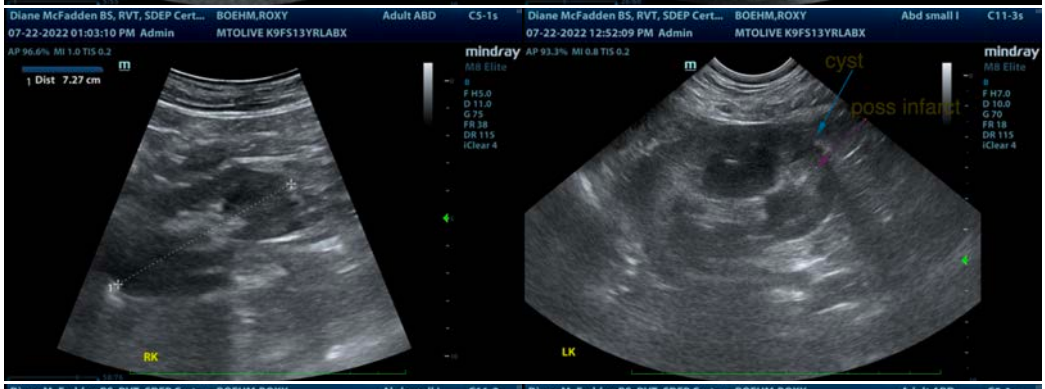

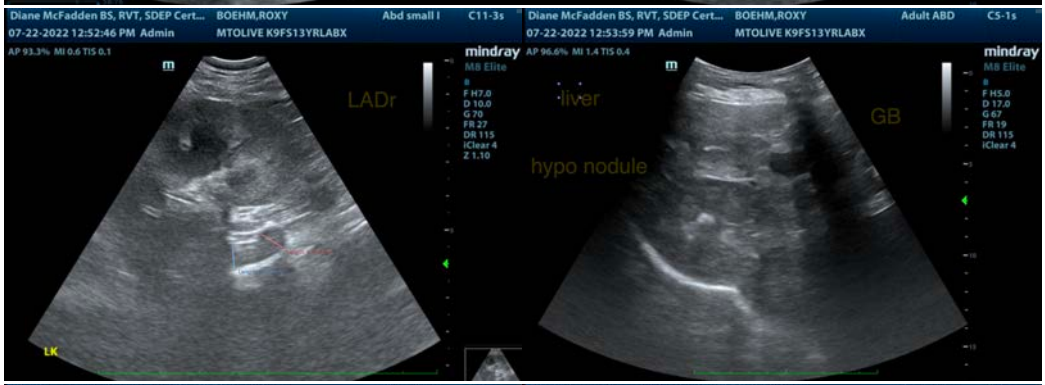

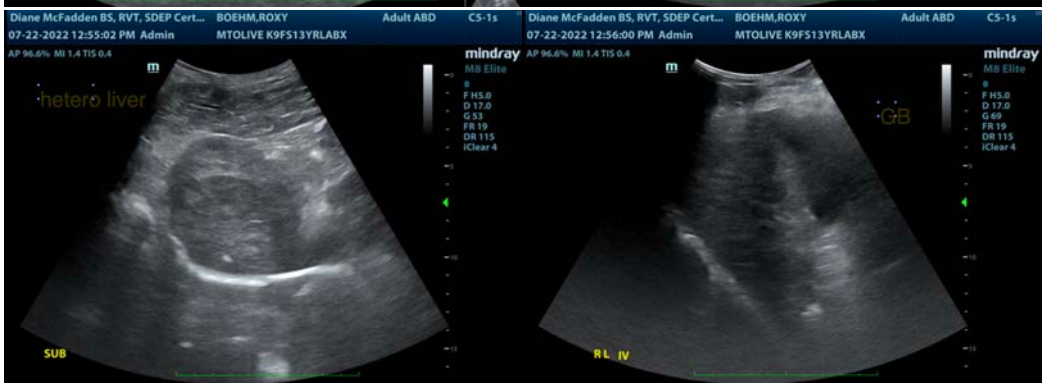

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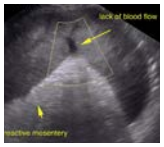
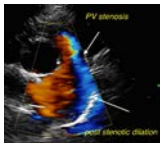
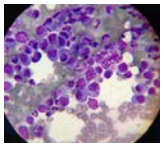
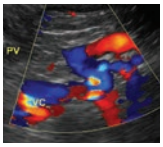

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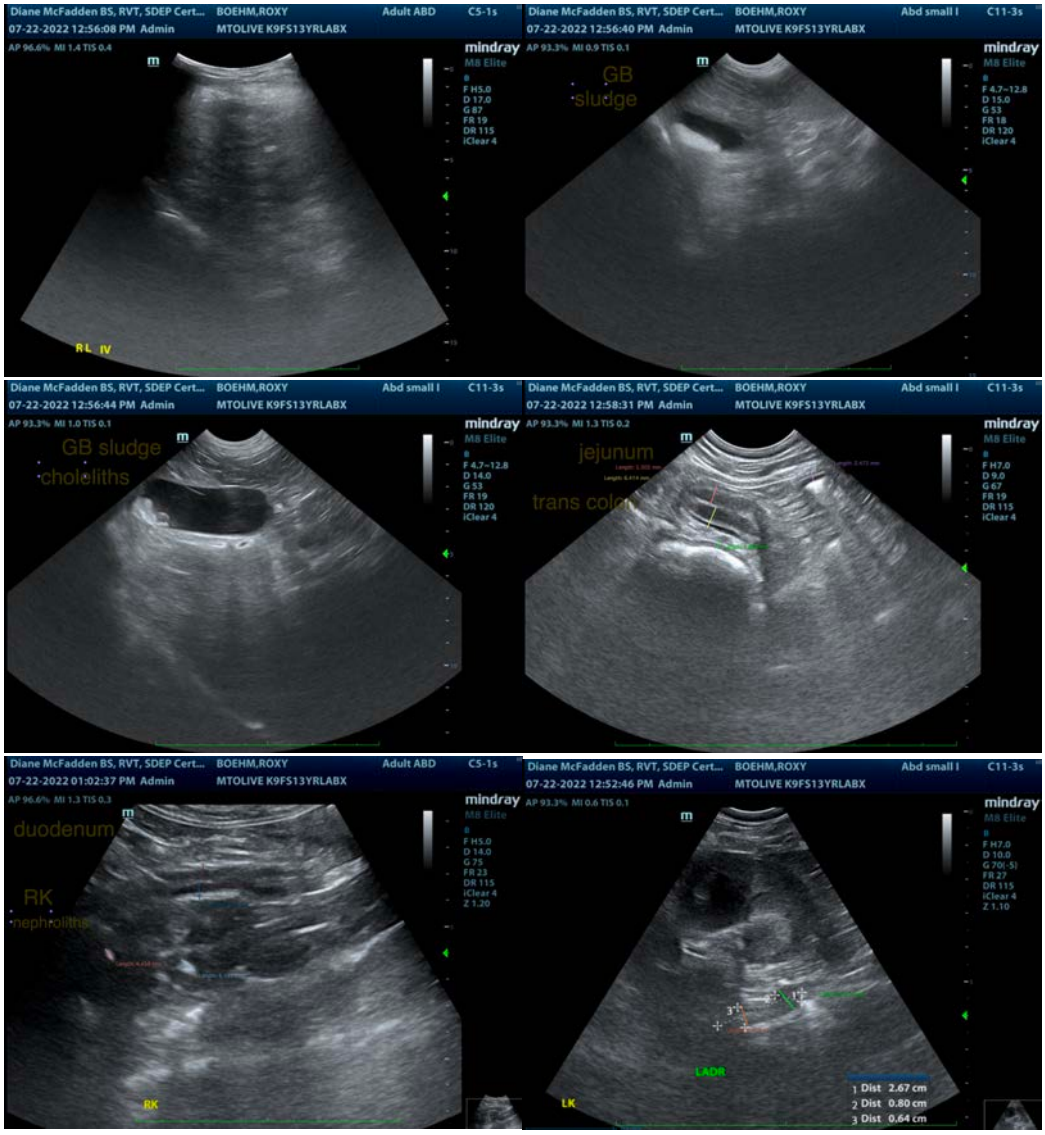

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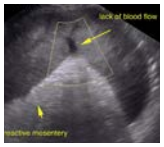
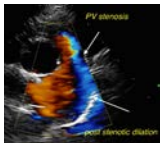
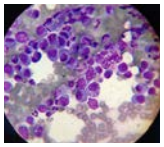
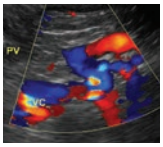

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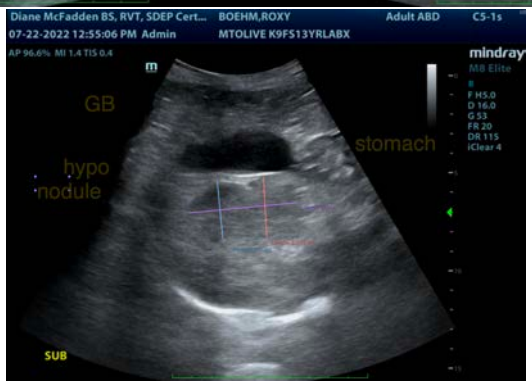

The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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.

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

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