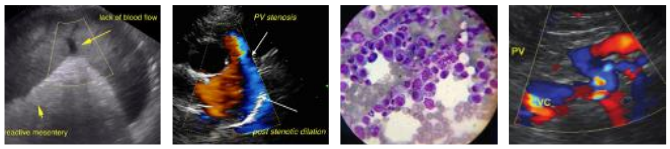
SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™



SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT

Goose Virser

SPECIES

Canine

BREED

Pomeranian Mix

SEX

Neutered Male

AGE

12 Years 5 Months

WEIGHT

14 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

HOSPITAL NAME

Greenwood Lake AH

REFERRING VET

Dr. Lover

INVOICE

22401

DATE

5/9/23

PRESENTING CLINICAL SIGNS

Soft stool (from Meloxicam). Decreased appetite. Elevated ALP/WBC

Current Meds: Meloxicam

Abnormal CBC/chem findings: ALT 56, ALP 869, GGT 32, Tbili 0.2, WBC 23.5

Abnormal U/A findings: UPC 0.4 USG: 1.022

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The **urinary bladder** was structurally normal, however, small pinpoint calculi were noted, nonobstructive, measuring up to 2.0 mm.

The **kidneys** revealed largely normal size and structure, corticomedullary definition and ratio (cortex 1/3 of medulla) were essentially maintained with some moderate age-related loss of curvilinear patterns regarding the capsule and C/M junction. The cortices presented largely uniform texture with some increased echogenicity expected for his age patient. Medullary structure differed distinctly from that of the cortex. The left kidney measured 5.03 cm. Slight pyelectasia was noted in the left kidney. The right kidney revealed similar changes as the left.

Adrenal Glands

The **left adrenal gland** was slightly irregular, measuring 1.69 cm x 0.79 cm.

The **right adrenal gland** was 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 2.0 cm x 0.6 cm.

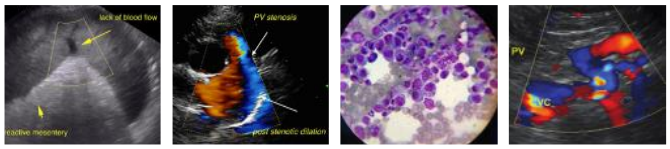
Spleen

The **spleen** was uniformly enlarged with relatively uniform parenchyma without evidence of masses. The capsule was mildly swollen. This is most consistent with hypersplenism and reactive hyperplasia deriving from splenic white or red pulp. However, early infiltrative disease, such as lymphoma or mast cell neoplasia can, at times, present in this manner but not suspected. 25g US-guided FNA would be best in order to ensure only reactive hyperplasia is present. If clinical signs fit with potential neoplasia or mast cell disease, then Benadryl injection (1 mg/pound IM) 15 minutes prior to FNA would be recommended. This is a minor change.

Liver

The **liver** in this patient revealed a 10+ cm mixed hypoechoic, peripherally inflamed nodular mass with ill-defined margins, occupying the majority of the left liver, impinging upon the diaphragm cranially, escaping the hepatic capsule caudally, with ill-defined nodular extension into the right medial liver. Nodular changes were also noted in the right liver that are not as dramatic, however, target type changes are noted throughout the left liver and the bridge between the left and right liver in the medial liver. Gallbladder calculi were also noted, nonobstructive.

Gastrointestinal



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The **gastrointestinal tract** was structurally unremarkable yet deviated caudally by the hepatic pathology.

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.

Free Abdomen

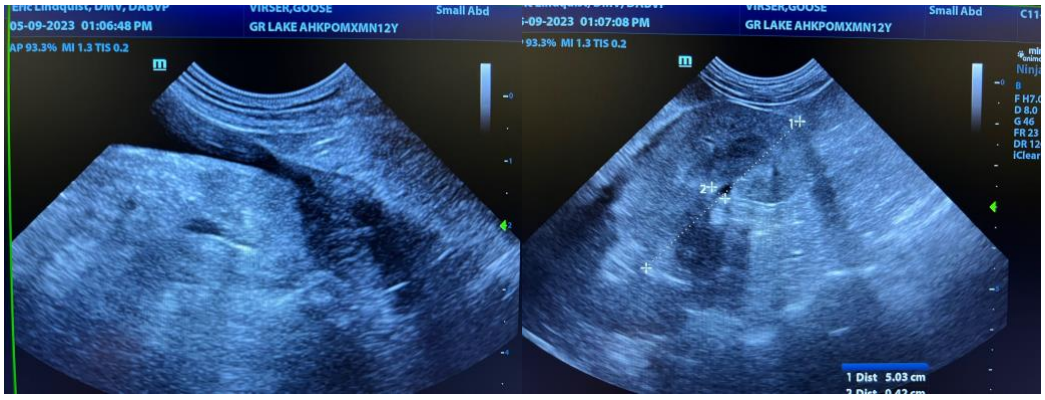
Trace amounts of **free fluid** were noted adjacent to the liver lobe.

ULTRASONOGRAPHIC FINDINGS

- Extensive left sided liver mass, progressing to the right medial liver with significant inflammation. This is likely carcinoma and possibly resectable.
- Free fluid adjacent to the liver lobe
- Age-related renal changes with left renal pyelectasia
- Slightly irregular left adrenal gland
- Hypersplenism
- GI tract deviated caudally by the hepatic pathology

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

CT evaluation for surgical planning is warranted, however, the margins are very ill-defined, extending to the medial liver. Therefore, clean resection isn't likely, owing to potential diaphragmatic involvement



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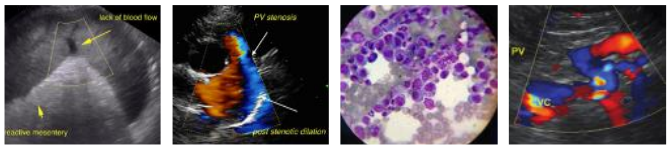

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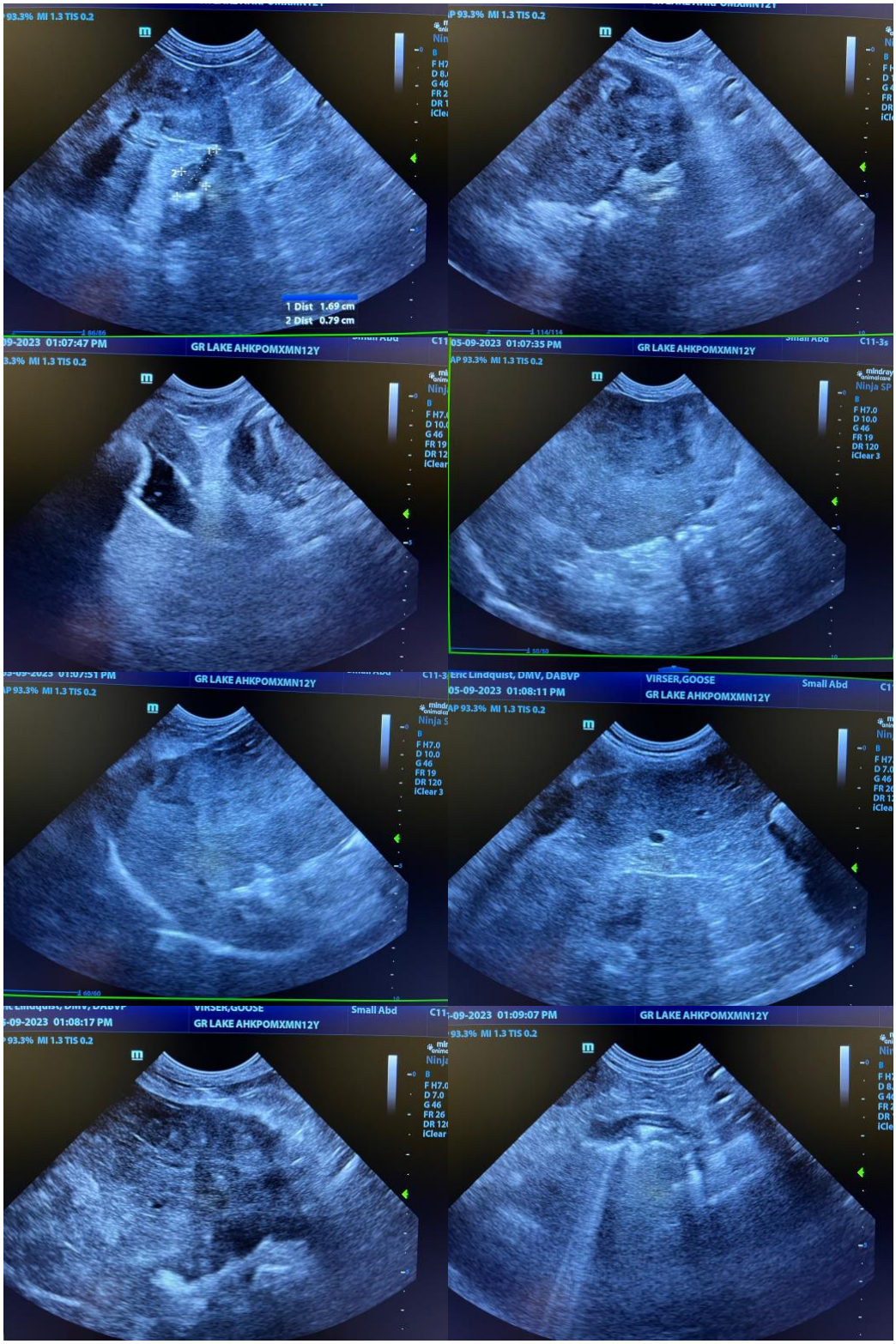

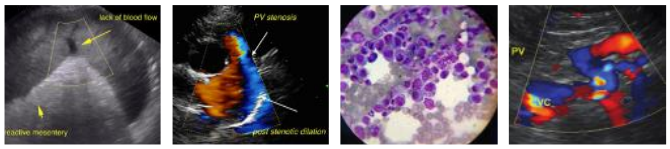

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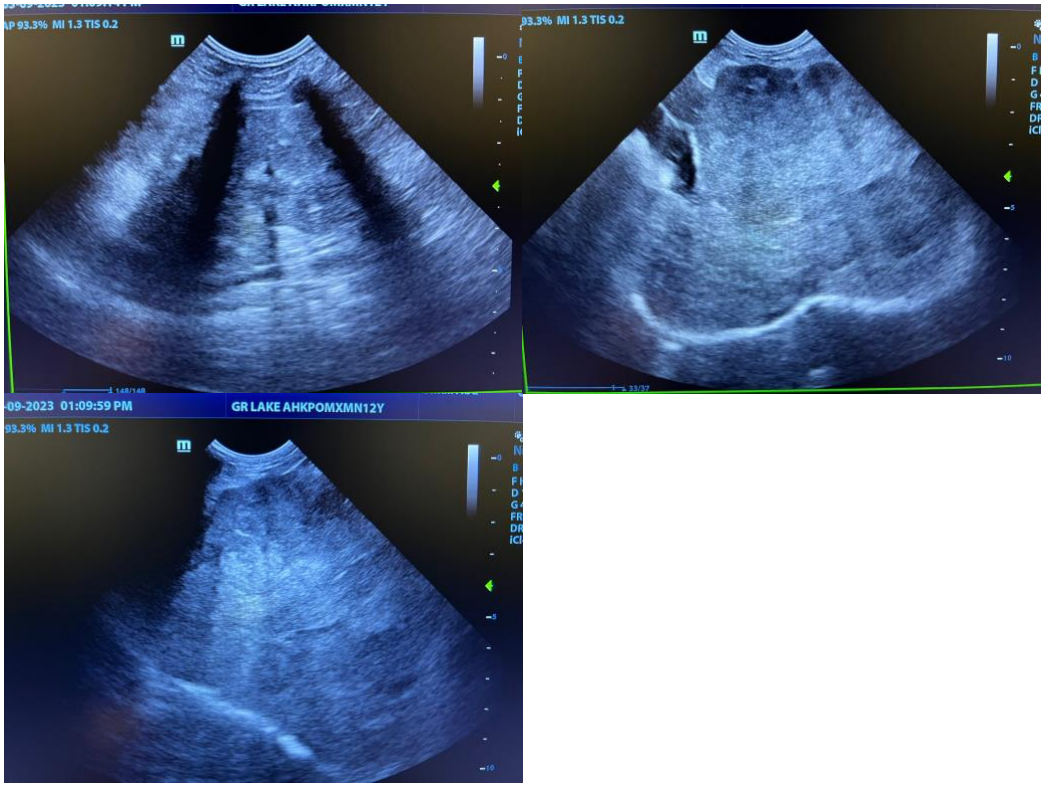


The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

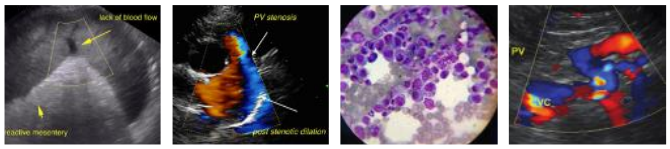
Thank you for this referral. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance please contact me.

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

Hepatic Masses, Biliary Adenoma, and Biliary Adenocarcinoma

http://www.sonopath.com/HepaticMasses

Description: Hepatocellular carcinoma typically manifests in the liver's left lateral lobes, yet may cross over to the right lobes should it derive from the hilus. These masses often present cavitating, necrotic cores that are difficult to distinguish from hepatic abscesses. Vascular channels may also be involved, and bile duct obstruction is often present. Older felines often present solitary or multiple fluid-filled cysts within the hepatic parenchyma. The latter are typically benign cystadenomas and should be differentiated from: cystic adenocarcinoma; hepatic lymphoma (usually diffusely hyperechoic +/- FIV/FeLV association); metastatic neoplasia (diffuse hyper- to hypoechoic nodules secondary to mammary adenocarcinoma, splenic hemangiosarcoma, or pancreatic or intestinal adenocarcinoma); benign nodular hyperplasia (accompanied by minimal to no symptoms); hepatic



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cirrhosis (regenerative nodules); or rare carcinoids, fibrosarcomas, leiomyosarcomas, and osteosarcomas.

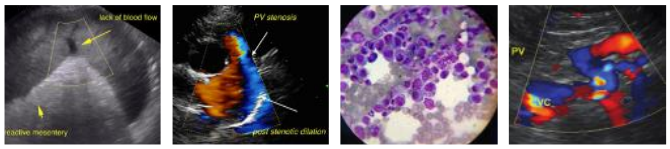
Clinical Signs: Possible clinical signs and physical exam findings include cranial abdominal organomegaly, sudden collapse associated with mass rupture, vomiting, ascites, jaundice (severe cases), and hypoglycemia secondary to a paraneoplastic syndrome. Sepsis and fever associated with secondary abscessation of the mass may also occur. Cats usually present with anorexia and lethargy.

Diagnostics: Routine biochemical analysis primarily shows liver enzyme elevation (i.e., ALT for cellular necrosis; SAP for hepatic congestion; elevated bilirubin for stasis/obstruction; bile acids > 75-100uM/L for significant function impairment). Staging of the disease with 3-view thoracic radiographs is essential, as is conducting a CBC, serum biochemistry, urinalysis, as well as abdominal and possibly also thoracic ultrasounds in order to provide the owner with adequate and well-informed options. Surgical and oncological referral is recommended after a coagulation panel has been assessed and ultrasound-guided biopsies of both normal and pathological tissue have been performed such that the disease is adequately characterized. In cases where surgical resection is impossible, direct chemoembolization of the tumor blood supply could be considered; however, this procedure is only performed at specific tertiary referral locations. Placement of palliative stents into the caudal vena cava (CVC) can be considered as well if compression by an unresectable tumor causes excessive ascitic fluid accumulation. Serum alpha-fetoprotein (AFP) has been shown to reemerge in dogs with malignant hepatobiliary adenocarcinoma. Ultrasound is important to localize the mass in relation to the portal hilus and gallbladder. The portal vein, CVC, aorta, gallbladder, and bile duct should all be identified with respect to the location of the mass to determine resectability. Ultrasound also allows for an examination of possible metastatic sites in the abdomen and, to some degree, in the thorax.

Treatment: Hepatic adenoma, hepatoma, and adenocarcinoma are usually amenable to surgical resection via hepatic lobectomy should the pathology be isolated to single-lobe progression. Multi-lobar presentation may be amenable to lobectomy and debulking; this will be determined further during surgical consultation. These tumors tend to displace unaffected parenchyma, allowing for relatively straightforward surgical resection. Up to 80% of the liver can be removed without long-term functional deficits. Blood transfusions may be necessary during surgery. The development and implementation of the LDS™ stapler has helped to streamline the procedure. Most carcinomas have metastasized by the time of diagnosis yet tend to be slow-growing; thus, it may be possible for a certain quality of life to be attained via surgical resection. Hepatic hemangiosarcoma has usually metastasized at the time of diagnosis and carries a much poorer prognosis. Surgical resection and chemotherapy are recommended, but considered by many to be an “aggressive” approach.

Preliminary trials have shown that gemcitabine is well tolerated and yields good responses in cases of hepatic as well as pancreatic, colonic, and gastric carcinomas. Myelosuppression, however, remains the key issue. Doxorubicin, cyclophosphamide, and fluorouracil combinations have also proven fruitful.

Nonsteroidal anti-inflammatory drugs (NSAIDs) have been demonstrated to have an anti-neoplastic effect due to their inhibition of COX-2 in certain tumor cells. The end product of the cyclooxygenase cascade is



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prostaglandin E2, which, when expressed in tumor cell lines—and not expressed in normal cells of that particular cell line—results in inhibited apoptosis, immunosuppression, and increased angiogenesis, proliferation, and invasiveness. Inappropriate increases in COX-2 expression have been documented in certain neoplasias, including squamous cell carcinoma, mammary carcinomas, prostatic carcinoma, malignant melanoma, and transitional cell carcinoma.

Metronomic chemotherapy is currently being investigated and compared to traditional chemotherapy protocols; it is thought to be at least as effective as the latter with substantially less toxic side effects. Metronomic chemotherapy is the practice of uninterrupted administration of low-dose cytotoxic drugs at regular and frequent intervals, as opposed to high-dose, shorter-term protocols characteristic of traditional chemotherapeutic practices. The lower dose allows for long-term administration without toxic side effects, and has been postulated as providing longer remission intervals. Moreover, it has the benefit of minimizing the intervals between drug regimens—the period during which tumor cells may repopulate the area—as well as the chance of developing multi-drug resistant genes. Metronomic chemotherapy has been used successfully in human patients who have undergone previous chemotherapy administration. It is thought to destroy endothelial cells, thereby retarding angiogenesis and targeting regulatory T cells. To date, there have only been a few small clinical trials in veterinary patients, and these have focused on animals that have hemangiosarcoma and soft tissue sarcomas.

Conclusion: With respect to hepatic neoplasia, many surgical and chemotherapeutic options exist; however, it is best to consult with a local board certified oncologist who can help determine the best course of action.

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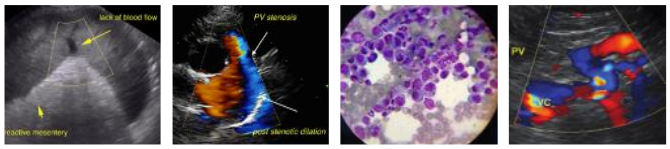

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Milner RJ. Do NSAIDs make a difference in cancer? Proceedings from the American College of Veterinary Internal Medicine Forum, Denver, CO, June 15-18, 2011.