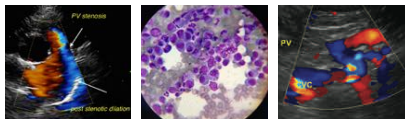
IMAGING PERFORMED BY

IntraPet.com



SonoPath
Clinical Sonography & Telecytology
EDUCATIONAL TELECONSULTATION SERVICES™
1-800-838-4268 info@sonopath.com SonoPath.com

DATE

2/22/22

PATIENT

Spike Ross

SPECIES

Canine

BREED

Pitull mix

SEX

Male, intact

AGE

8/19/2009

WEIGHT

63.9 lbs.

INTERPRETED BY

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

HOSPITAL NAME

Animal Emergency Hospital

REFERRING VET

Dr. Thompson

INVOICE

13016

PRESENTING CLINICAL SIGNS

2-21-22: Patient has had 3 seizure events over the past 2 weeks. He was seen by rDVM today and was diagnosed with low blood glucose. rDVM mentioned possible insulinoma. Referred here for further work up. Has severe arthritis in both knees, otherwise no medical concerns.
Current Medications: None listed.
Lab Results: Persistent hypoglycemia.
Date of Previous IntraPet Ultrasound: No previous.
Sedation: IV sedation.
Stat Report: Not requested.
Imaging Performed By: Rachel Brilhart, 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** revealed largely normal size and structure, corticomedullary definition and ratio (cortex 1/3 of medulla) were essentially maintained with some 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 this age patient. Medullary structure differed distinctly from that of the cortex and no evidence of pelvic dilation was present. The right kidney measured 5.83 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 2.92 x 0.71 cm at the caudal pole and 0.83 cm at the cranial pole. The left adrenal gland measured 2.79 x 0.7 cm at the caudal pole and 0.74 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** images submitted revealed subjectively normal liver size, contour, and structure. A focal, right cranial, hypoechoic liver nodule was noted and measured 1.78-1.93 cm. Larger, coalescing, nodules were noted. Grouping of which measured 2.8 x 2.53 cm. Parenchymal echogenicity was naturally coarse and hypoechoic to the spleen. Vascular and biliary tracts were of normal volume with no evidence of congestion. The gallbladder presented acceptably thin walls with primarily anechoic content. The cystic and common bile ducts were normal. No pathological hepatic lymphadenopathy was evident. No overt structural evidence of inflammatory, infiltrative or regenerative pathology 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. Retention of ingesta was noted in the stomach. Small and large intestine demonstrated normal luminal chyme and stool consistency respectively. The mesenteric lymph nodes were slightly enlarged and measured 1.8 x 0.73 cm.

Pancreas

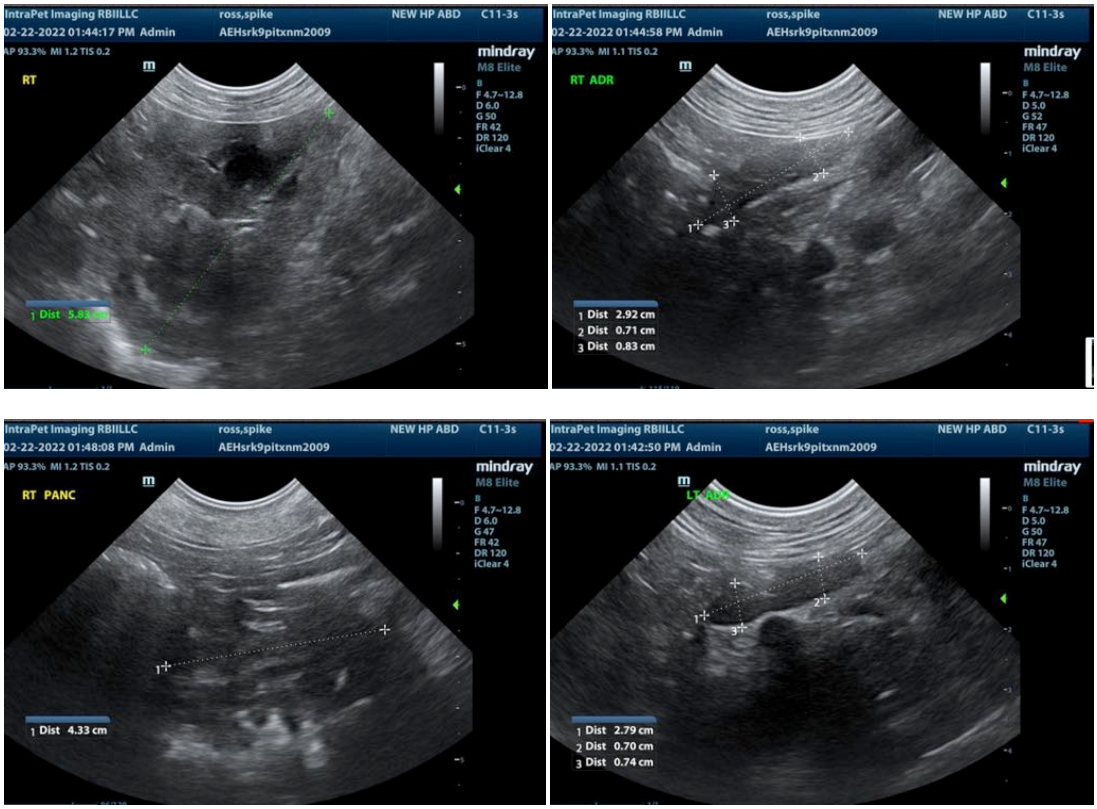
The **pancreas** revealed minor irregular contour and coarse architecture without overt nodules.

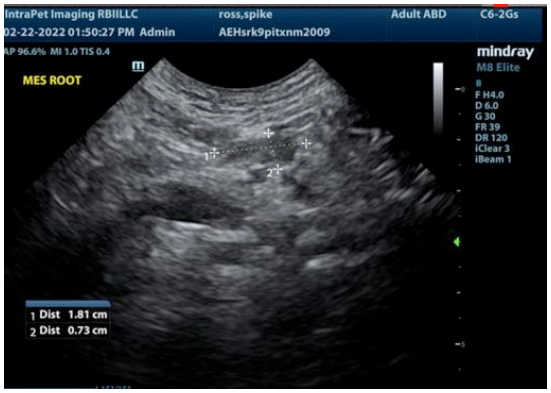
ULTRASONOGRAPHIC FINDINGS

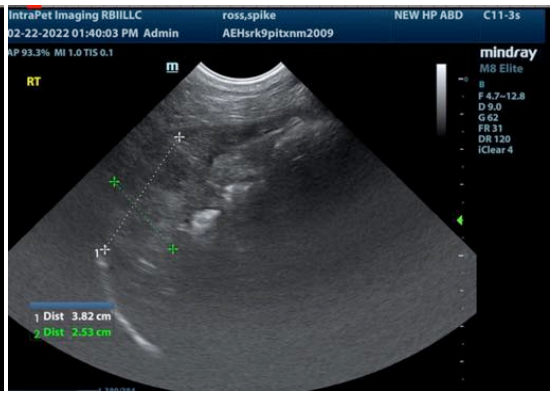
Liver nodules.
Mild pancreatic remodeling without overt evidence of primary lesion.
Otherwise, unremarkable abdomen.

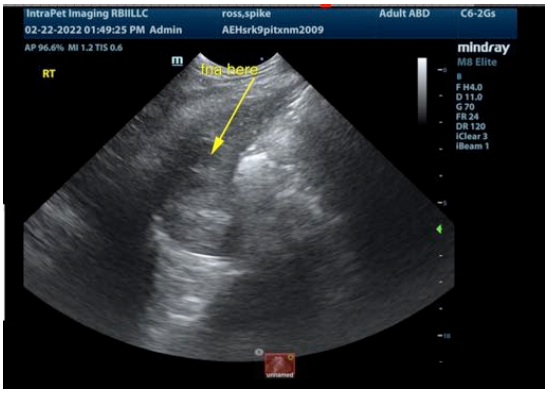
INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

FNA of the liver lesions is warranted to assess for potential metastatic insulinoma.









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

The following is an applicable excerpt from the *Curbside Guide to Diagnosis & Treatment of Sonographic Disease* offered by SonoPath.com Lindquist, Frank, Lobetti, and Modler.

An essential quick guide for every general practitioner and sonographer.

https://sonopath.com/products/curbside-guide-editing-due-release-12012015

Hypoglycemic Syndrome: Insulinoma and Other

http://www.sonopath.com/Hypoglycemia

Short axis of the left pancreatic limb in a dog with an insulinoma seen as an ovoid hypoechoic mass lesion expanding the pancreatic capsule.

Description: Hypoglycemia can be found incidentally or associated with non-specific clinical signs, such as listlessness and weakness. It is essential to consider the multiple differentials for hypoglycemia in order to avoid a potential hypoglycemic crisis. One must perform a rapid and efficient workup to arrive at a diagnosis and prescribe the proper therapy.

Differentials for hypoglycemia include: laboratory or handling error; sepsis; toxins (e.g. xylitol, ethylene glycol); hunting dog hypoglycemia; Addison's disease; polycythemia; liver failure; poorly regulated diabetes mellitus; and neoplasia (e.g. leiomyosarcoma, hepatic, lymphoma, and insulinoma).

Once other causes of hypoglycemia have been ruled out, one may initiate an investigation into the possibility of insulinoma. Insulinoma is a tumor of the pancreas that originates in the beta cells and leads to the unregulated secretion of insulin and hypoglycemic syndrome. The tumor can be a malignant carcinoma or a more benign form of adenoma. There is, however, controversy regarding the exact histopathology associated with insulinoma types.

Insulinoma patients are usually middle-aged dogs. Half of all cases present with metastasis to the lymph nodes, liver, and mesentery at the time of diagnosis. There are 3 stages of insulinoma:

Stage 1: Pancreatic localization
Stage 2: Pancreas and lymph nodes with a median survival time (MST) of 1.5 years
Stage 3: Organ metastasis with an MST of 6 months.

Clinical Signs: Neurogylocopenia syndrome results in lethargy, ataxia, collapse, and seizures. Catecholamine release from hypoglycemia leads to hunger, behavior changes, and muscle tremors. Postprandial exacerbation of clinical signs can occur.

Diagnostics: When investigating for insulinoma, one should use a fluoride-containing tube (i.e., a grey top tube) to obtain an accurate glucose level. A fasting glucose level below 60 mg/dl is diagnostic for hypoglycemia. Insulinoma is indicated when one observes the Whipple's triad of hypoglycemia, clinical signs consistent are with hypoglycemia, and the latter resolve with the administration of dextrose.

Fasting insulin and glucose ratio: A high normal to elevated insulin level with glucose < 60 mg/dl is diagnostic for insulinoma.

Imaging: Localizing the lesion with staging is best approached by ultrasound. The ability to localize the lesion may be highly operator- and/or machine-dependent given the often small or even microscopic nature of insulinoma, especially early on in the disease. Primary or secondary lesions associated with insulinoma can often be identified with higher resolution sonography. Appropriate ultrasound-guided sampling (FNA or core biopsy) can be performed of any enlarged lymph node or hepatic nodule if a primary pancreatic lesion is not seen.

Computed tomography (CT) with contrast is likely more sensitive than the average sonographer when it comes to assessing insulinoma.

Tumor staging and histopathological characterization in conjunction with the Ki67 biomarker index will yield solid criteria for the prognostic evaluation of insulinoma.

Treatment:
In cases of emergency hypoglycemic crisis, apply corn syrup to the gums. Administer a dextrose bolus (0.5g/kg IV) and maintain 2.5-10% dextrose solution. If cerebral edema occurs, one should administer dexamethasone (2 mg/kg IV) and give mannitol (0.5 mg/kg IV) over a 20-minute period.

One should perform a surgical pancreatectomy if the tumor is localized (i.e., stage 1 insulinoma). Given that the lesion may be difficult to locate with the naked surgical eye or via palpation, the surgical procedure can be enhanced by intraoperative ultrasound.

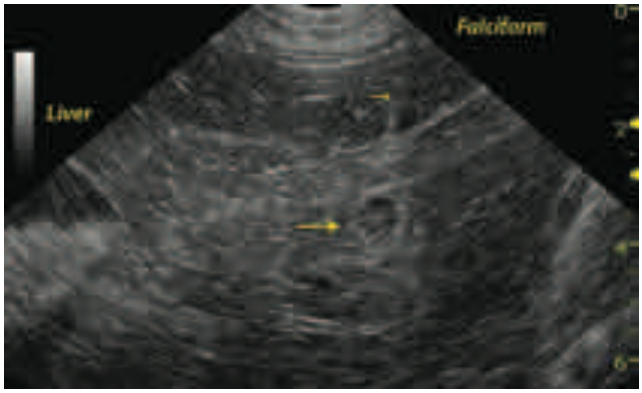
In cases of stage 2 and 3 insulinoma, administer prednisolone (0.25 mg/kg PO BID). A glucagon IV infusion has also been suggested; it should be infused with saline at 5 mg/kg/min for refractory cases. If prednisone is not adequate, one can supplement with benzothiadiazide diazixide (5 mg/kg PO BID).

Patients should be fed small, frequent portions of a diet high in fat, complex carbohydrates, and protein.

Chemotherapy: In some cases, the use of alloxan (65 mg/ kg IV) has been shown to be helpful.

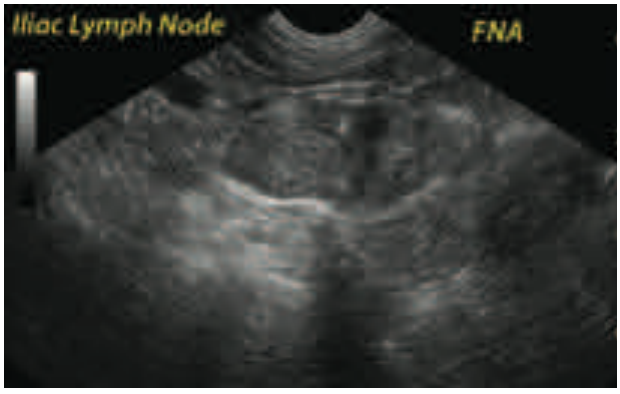
Conclusion: The largest study of insulinoma patients identified a general MST of 547 days; however, the MST was 785 days for those undergoing pancreatectomy and 1316 days for those that relapsed after surgery and received treatment with prednisone. Other studies have reported an MST of 258 days with pancreatectomy. All of these results indicate that insulinoma is treatable. Using ultrasonography for staging and histopathological characterization is essential in order to determine whether the appropriate treatment should be surgical, medical, or both.

Short axis of the left pancreatic limb in a cat with an insulinoma seen as a complex heterogenous mass lesion expanding the pancreatic capsule (between calipers). Note the mass effect of the tumor displacing the transverse colon caudally.



Subxiphoidal short axis of the liver in a dog with an insulinoma during ultrasound guided sampling ofa suspected metastatic lesion.

The needle trajectory is seen asa hyperechoic line (small arrow) approaching the hypoechoic nodule (large arrow) within the liver parenchyma.



Long axis of the medial iliaclymph node during ne needle aspiration in a dog with multifocal metastatic spread of an insulinoma. The echogenic needle tip isseen within the lymph node.The metastatic lymph node is enlarged, rounded, hypoechoic and heterogenous. The primary metastatic loci in insulinoma are the regional lymph nodes (hepatic, pancreaticoduodenal, gastric)and the liver. Hence, metastatic insulinoma lesions in the iliac lymph node in this case was not a typical occurrence.

References:

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