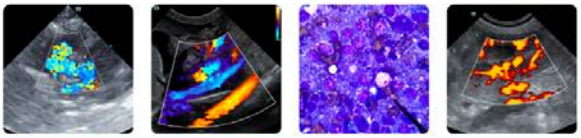

PATIENT

Coco Howard

SPECIES

Canine

BREED

Shih Tzu

SEX

Spayed Female

AGE

11 Years 6 Months

WEIGHT

7.1 lbs

INTERPRETED BY

Eric Lindquist, DMV, DABVP (CFM), Cert. IVUSS

IMAGING PERFORMED BY

Dr. Ken Leal

HOSPITAL NAME

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REFERRING VET

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PRESENTING CLINICAL SIGNS

Not eating even with mirtazapine. Grade 2 heart murmur. Gas present in abdomen. Hx of hepatomegaly. Protein losing nephropathy

Medications: Amlodipine, telmisartan, melatonin, pepcid, cerenia, Mirtazapine

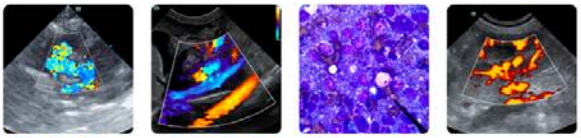
Abnormal PE/Chem/CBC/UA Results: ACTH still pending.

ULTRASONOGRAPHIC EXAMINATION OF THE HEART & ABDOMEN

CANINE CARDIAC PARAMETERS	MR VMAX (m/s)	TR VMAX (m/s)	LA/AO (M-Mode)	LA/AO (Heart Base; Swe)	FS (%)	EF (%)	EPSS (cm)
NORMAL PARAMETER	4.5-5.5	<2.7	1.3	Up to 1.6	28-40	40-100	<0.6
PATIENT	--	2.5	1.0	1.0	58	90	0.1
CANINE CARDIAC PARAMETERS	**HR** (BPM)	**AV VMAX** (m/s)	**PV MAX** (m/s)	**BODY WEIGHT** (lbs)	**LAD** LA MAX 4 Chamber	**LVIDd** Avg; 2D and m-mode short axis (cm)	**LVIDs** Avg; 2D and m-mode short axis (cm)
NORMAL PARAMETER	50-100	0.7-1.7	0.7-1.6				
PATIENT	110	160	2.24	7.1	2.1	1.7	--

Cardiac Presentation

The echocardiogram in this patient demonstrated normal **left atrial** size based on 3 different LA measurement methods. Chamber volumes and echogenicity were normal. The cranial and caudal **mitral** valve leaflets presented vegetative thickening consistent with endocardiosis. Doppler indicated minor mitral insufficiency. The **left ventricle** presented concentric hypertrophy. Given the hypertension, this is likely owing to hypertensive cardiomyopathy. However, hypertrophic cardiomyopathy cannot be ruled out.The **myocardium** presented normal echogenicity without subjective evidence of significant fibrotic or ischemic disease. **Contractility** of the ventricular walls was adequate and in normal range for this patient evidenced by the fractional shortening measurement and subjective evaluation of the different regions of the myocardium. The **left ventricular outflow** tract demonstrated normal laminar flow and subjective structural integrity. The **right atrium** and auricle revealed normal size, structure and content. No evidence of masses was noted or chamber overload. **Tricuspid** insufficiency noted. The **right ventricle** was of normal size (1/3 diameter of LV), chordae structure, myocardial echogenicity and thickness. **Pulmonic** tract assessment revealed normal valve structure, laminar flow, and diameter (approx.1:1 pa/ao ratio). No visible **pericardial** or free pleura fluid was noted. No echographically detectable evidence of infiltrative disease was visible. The cranial **mediastinum and pericardial regions** were free of masses in the visible window.



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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 were noted. Ureteral papillae were normal.

The **kidneys** presented a relatively uniform cortical hyperechogenicity when compared to the renal medulla, spleen and liver. No overt masses were noted. Corticomedullary definition was nebulous and the ratio favored the cortex slightly. The ureters were not visible and assumed to be normal. These changes are most consistent with chronic interstitial nephritis yet infiltrative disease could not be entirely ruled out without biopsy though neoplasia is not suspected. The right kidney measured 3.6 cm. The left kidney measured 3.04 cm.

Adrenal Glands

The **left adrenal gland** was swollen with irregular contour to the cranial pole, measuring 2.08 cm in length x 1.0 cm at the cranial pole and 0.56 cm at the caudal pole. An isoechoic expansive nodule was noted at the cranial pole of the left adrenal gland. Capsular expansion noted without capsular escape or vascular invasion.

The **right adrenal gland** revealed an expansive mass measuring 1.8 cm x 1.8 cm deriving from the cranial body of the right adrenal gland and impinging upon the vena cava. No overt vascular invasion noted at the time of the sonogram. However, the phrenic vein was not evident and may be occupied.

Spleen

The **spleen** was normal size and relatively normal contour with multifocal hyperechoic areas of mineralization. This is a benign change; however, can be related to Cushing's disease or other endocrinopathies.

Liver

The **liver** images from right and left intercostal as well as subcostal views revealed subjectively normal liver size, contour, and structure. Some age-related parenchymal remodeling was noted but likely not clinically significant at this time. Vascular and biliary tracts were of normal volume and no evidence of congestion was noted. The gallbladder presented some dependent debris with essentially normal contour. The cystic and common bile ducts were normal. No overt evidence of active inflammatory, infiltrative or regenerative pathology was noted but should be paired with current or past LE elevations regarding any clinical significance to this presentation. The hepatic lymph nodes were unremarkable.

Gastrointestinal

Examination of the **gastrointestinal tract** revealed variable thickening with pyloric hypertrophy and mucosal remodeling. Gastric stasis noted. No overt physical obstruction other than pyloric hypertrophy.

Pancreas

The base and limbs of the **pancreas** were observed to be largely isoechoic to surrounding omental fat. Some parenchymal remodeling, however, with mild deviation from curvilinear normalcy was observed. Pancreatic duct and capsular irregularities were present consistent with age related changes. If pain upon imaging (+ Murphy sign) was present or if the patient is focally painful in subxyphoid palpation then low-grade smoldering chronic pancreatitis should be suspected.

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ULTRASONOGRAPHIC FINDINGS

- Right adrenal mass, left adrenal nodule.
- Variable GI thickening and pyloric hypertrophy – consistent with chronic inflammatory bowel.
- Interstitial nephrosis renal pattern.
- Mineralized spleen.
- Age related hepatic and pancreatic changes.

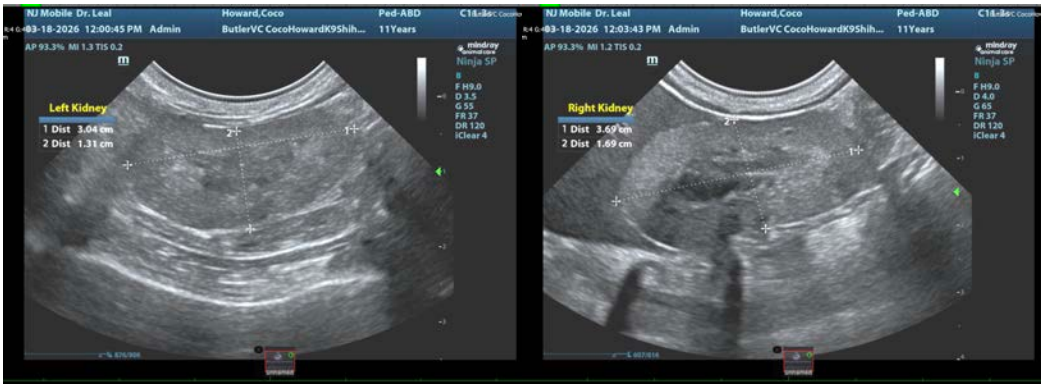
INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

The cardiac presentation is likely second to the chronic hypertension in this patient. As far as primary sources, emerging renal failure and protein losing nephropathy can be causing the hypertension. However, right or even left adrenal pathology such as pheochromocytoma or adenocarcinoma can be leading to hypertension. Recommend urine metanephrine level to assess for pheochromocytoma. Right adrenalectomy could be considered with appropriate GI biopsies +/- renal biopsy. However, I cannot rule out an underlying functional tumor starting in the left adrenal as well. GI protectant protocol warranted in the meantime as well as anti-hypertensives to reach target systolic pressure of <150. Management for gastritis and potential ulcerative disease indicated. Prognosis is guarded.

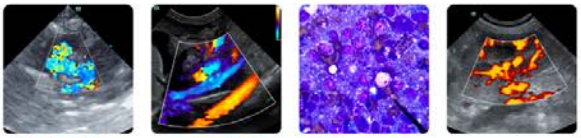
Serial blood pressure measurements are recommended in this patient. If hypertension is an issue metanephrine level is recommended. If the patient appears Cushingoid and urine specific gravity is less than 1.020 then work-up for adrenal dependent Cushing's is indicated. Recheck is recommended in 2-3 weeks to assess for any progression of the adrenal gland.

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



New Jersey Mobile
FUELED BY SONOPATH VETERINARY ULTRASOUND



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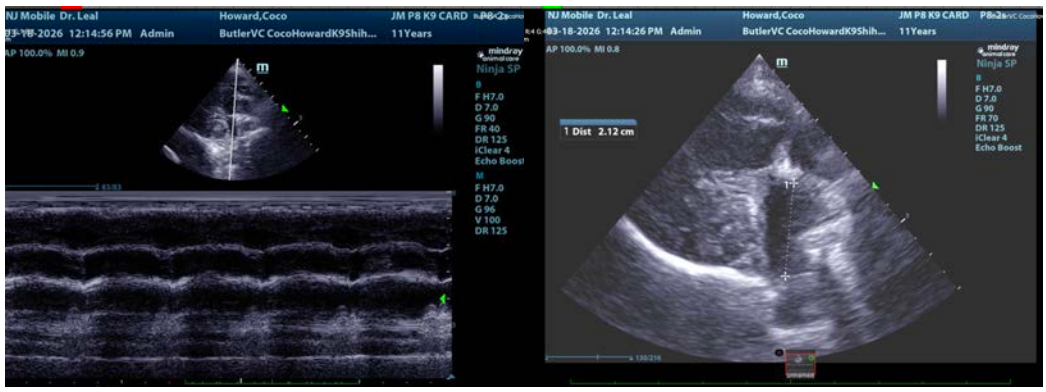

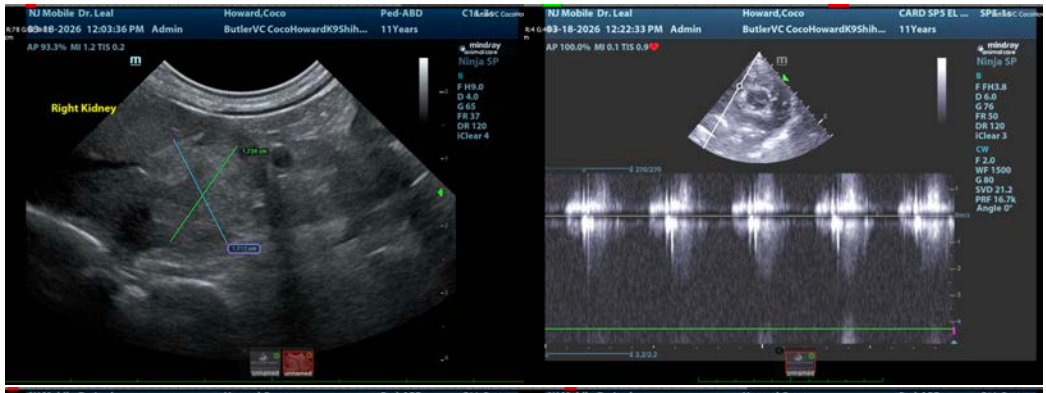

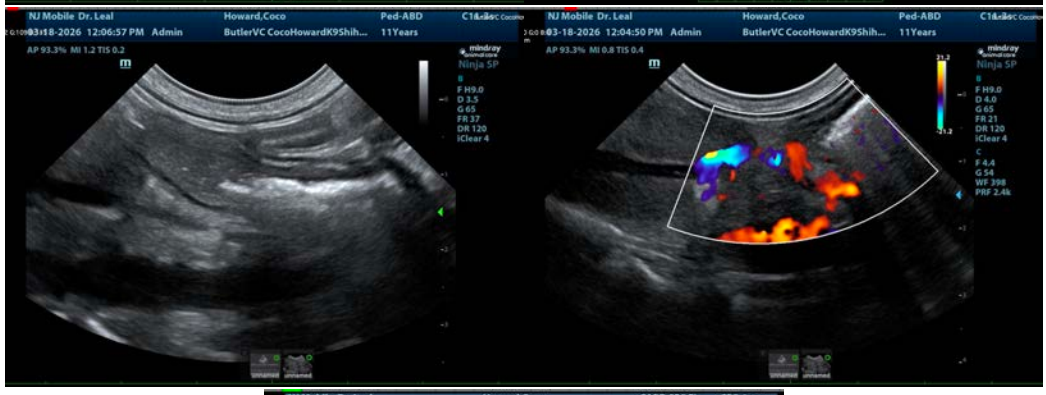

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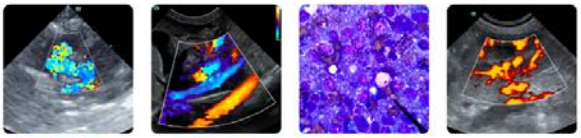

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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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(CFM), Cert. IVUSS,
CEO, Owner, Founder -- SonoPath.com
info@SonoPath.com