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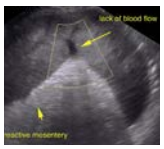
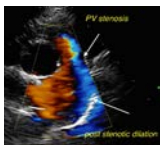
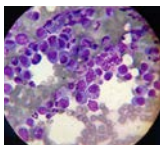
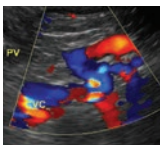

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1-800-838-4268 info@sonopath.com

**PATIENT**
Hannah Granfors

**SPECIES**
Canine

**BREED**
Shih Tzu

**SEX**
Female

**AGE**
12 Years

**WEIGHT**
7 kg

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

**IMAGING PERFORMED BY**
Dr. Callihan/AEC

**HOSPITAL NAME**
Animal Emergency Care

**REFERRING VET**
Dr. Loeffler/AEC

**INVOICE**
41649

**DATE**
9/25/22

## PRESENTING CLINICAL SIGNS

Presented to primary care on 9/22 for decreased appetite and lethargy X several days. Hospitalized yesterday 9/24/22 for Addisonian crisis, has been Addisonian since 2 yrs old. Has chronic liver enzyme elevations and chronic anemia but the anemia acutely worsened last night, with her PCV dropping from 26% to 14%, with protein ~ 5. 2 (down from 7.0) consistent with hemorrhage. Received pRBC transfusion. Has been stable since. Chronic heart murmur never worked up. Current meds: -Cerenia, gabapentin, Dex SP given last night, Prednisolone 3.75 mg p.o. q12h, Betacillin, Zycortal injection given yesterday.

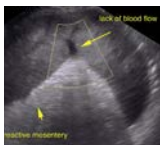
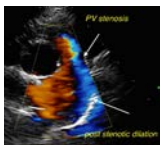
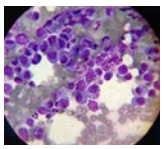
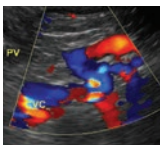
Abnormal PE/Chem/CBC/UA Results: -Thoracic rads 9/22 reported as normal -labs run 9/22 reported 9/24 showed elev BUN 129, Cr 2.6, SDMA 22 -ALT 196, ALP 717 -hyponatremia 137, hyperkalemia 7.8 -leukocytosis WBC 25K, anemia HCT 29% Labs on 9/24 worsening azotemia w BUN > 140, Cr 4 Na 133, K 7.5 Hypocalcemia (ionized Ca 1.17) UA showed rods and cocci -mature cataracts OU -severe dental disease -murmur 4/6 left, systolic -pendulous abdomen -PCV admit 25%, last night 14%, post-transfusion 20% -

## ULTRASONOGRAPHIC EXAMINATION OF THE HEART & ABDOMEN

| CANINE CARDIAC PARAMETERS | MR VMAX (m/s) | TR VMAX (m/s) | LA/AO (Boon method) | LA/AO (Heart Base; Swe) | FS (%) | EF (%) | EPSS (cm) |
|---|---|---|---|---|---|---|---|
| NORMAL PARAMETER | 4.5-5.5 | <2.7 | 1.3 | <1.6 | 28-40 | 40-100 | <0.6 |
| PATIENT | 6.6 | | 1.3 | 1.4 | 57 | 89 | NM |
| **CANINE CARDIAC PARAMETERS** | **HR** (BPM) | **AV VMAX** (m/s) | **PV MAX** (m/s) | **BODY WEIGHT** (kg) | **LA** 2D short axis Base view (cm) | **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 | BELOW | BELOW | BELOW | BELOW |
| PATIENT | 90 | 2.8 | 1.15 | | 2.2 | 2.4 | |

### *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 measurable insufficiency. The **left ventricle** presented thicknesses with linear contour and was not dilated nor restricted. The **myocardium** presented normal echogenicity without subjective evidence of significant fibrotic or ischemic disease. The heart was hypocontractile. Minor aortic insufficiency noted, not clinically significant at 5.0 m/sec. Aortic outflow velocity was mildly excessive, likely owing to the anemia. No structural evidence of disease noted. The **right atrium** and auricle revealed normal size, structure and content. No evidence of masses was noted or chamber overload. **Tricuspid** valvular assessment demonstrated adequate linear morphology. 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

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**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.

### *Urinary System*

The **urinary bladder** and visible pelvic urethra were unremarkable for the level of repletion presented. The urine, however, did present some mildly echogenic debris consistent with mucous, exfoliated cells from renal or bladder origin, and/or blood clots as these echogenic changes can all present similarly. This is often related to urinary tract infection but may represent simple evidence of exfoliated debris or sterile inflammation. Cystocentesis, urinalysis, +/- culture would be recommended to rule out and define any UTI.

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 his age patient. Medullary structure differed distinctly from that of the cortex and no evidence of pelvic dilation was present. The right kidney measured 4.2 cm. The left kidney measured 4.06 cm. Pelvic mineralization noted in the left kidney, non-obstructive.

### *Adrenal Glands*

The **right adrenal gland** was flattened. The **left adrenal gland** was not visible.

### *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 were noted.

### *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*

The **stomach** was empty. Minor areas of mucosal hypertrophy, yet not overt evidence of ulcerative disease. Some hyperperistalsis noted in the small intestine. The colon was fluid-filled.

### *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.

### *Other*

The uterus was barely visible at 4.0 mm, isoechoic to surrounding fat. Regions of the ovarian fossae were unremarkable.

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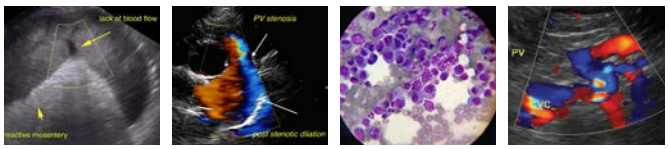

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## ULTRASONOGRAPHIC FINDINGS

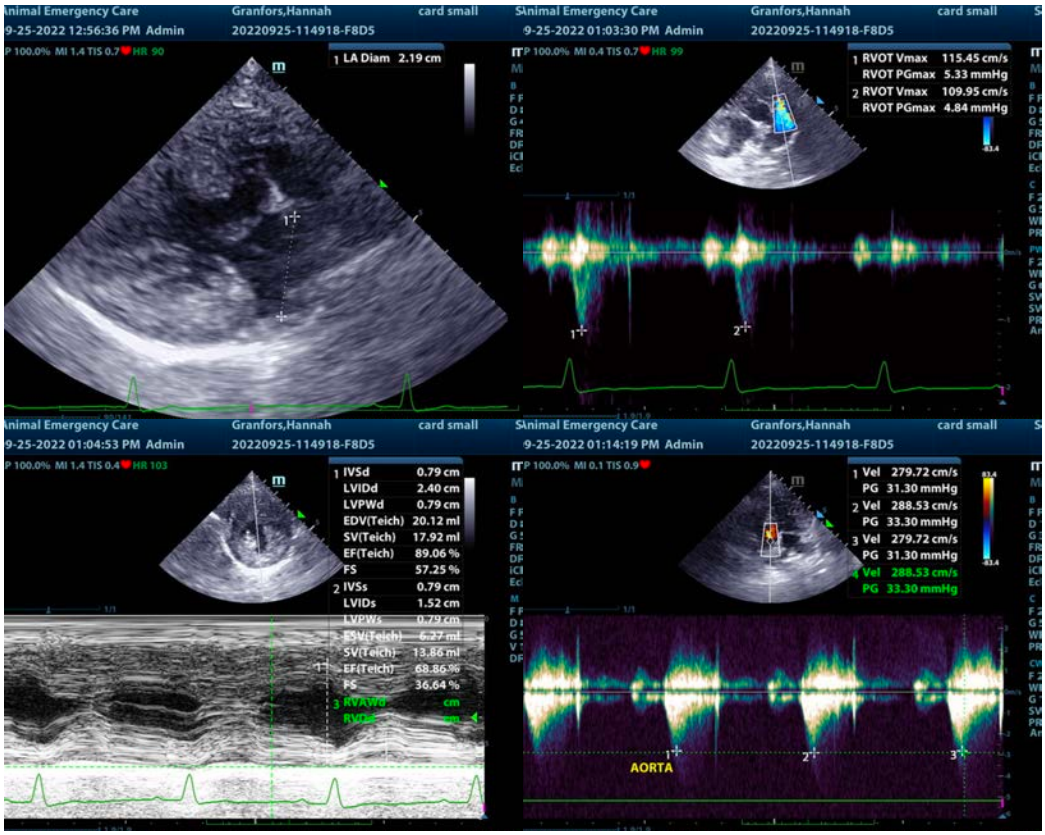
- Hypocontractile heart
- Mitral and aortic insufficiency, compensated
- Increased left ventricular outflow velocity, variable flow likely owing to the anemic state
- Structurally unremarkable abdomen with age related renal changes and mineralization
- Flattened/not visible adrenals

## INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

No evidence of pericardial effusion or masses. The kidneys do not appear end stage. Addisonian state should be evaluated in this patient, as enhanced supplementation may be necessary. There was no evidence of hemorrhage. GI ulcerative disease and blood loss may be the cause of anemia along with Addisonian state. GI protectants, 72-hour IV fluid protocol, urine culture, blood pressures, and reevaluation of the Addisonian state all indicated.

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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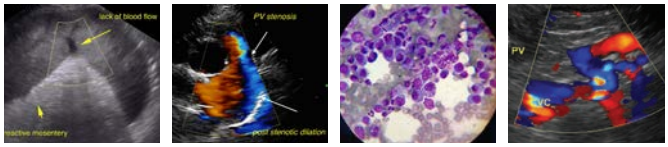

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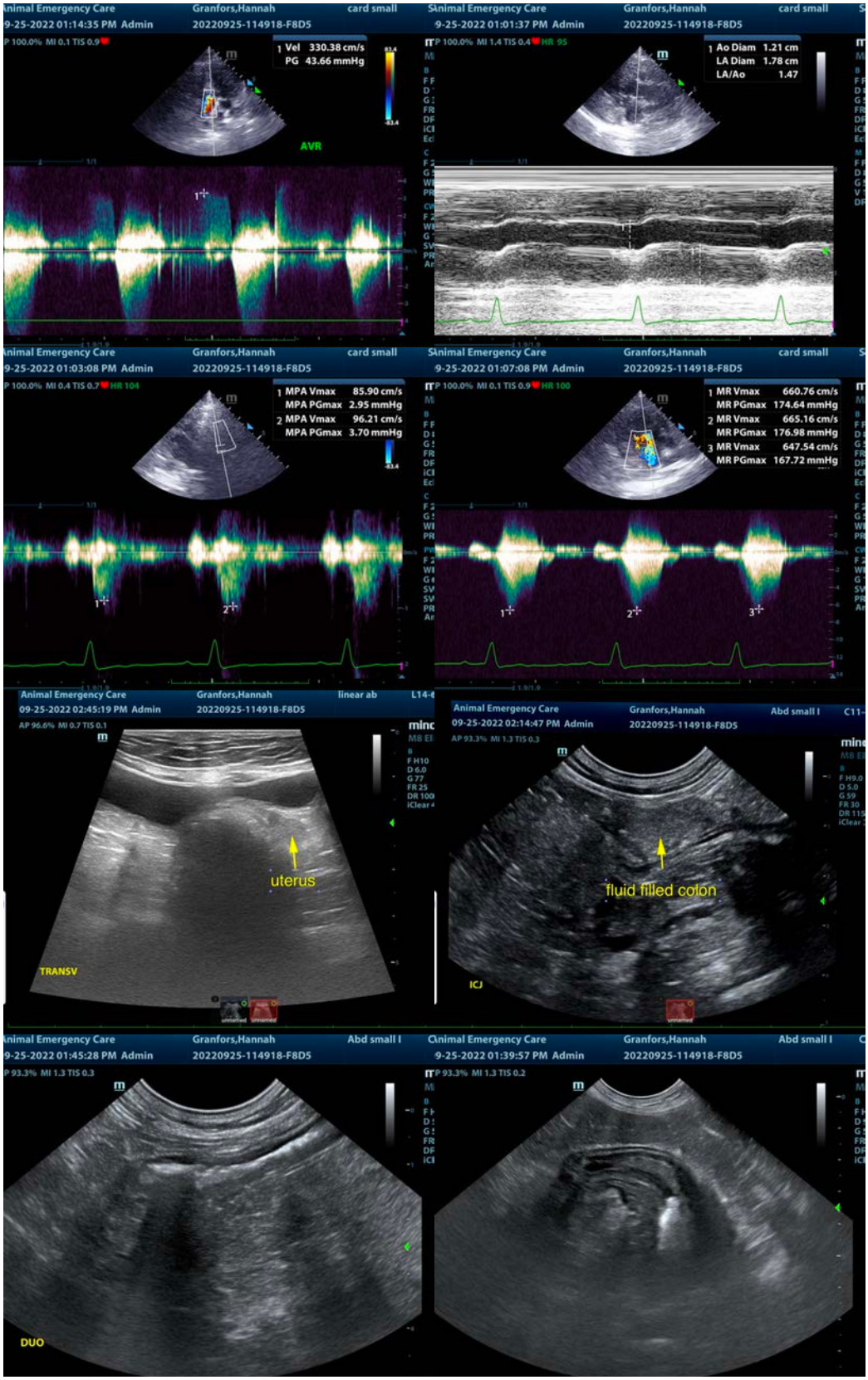

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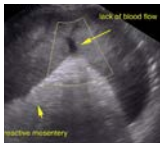
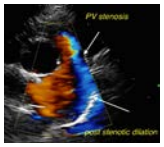
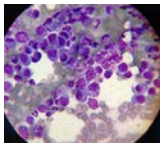
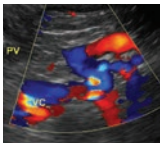

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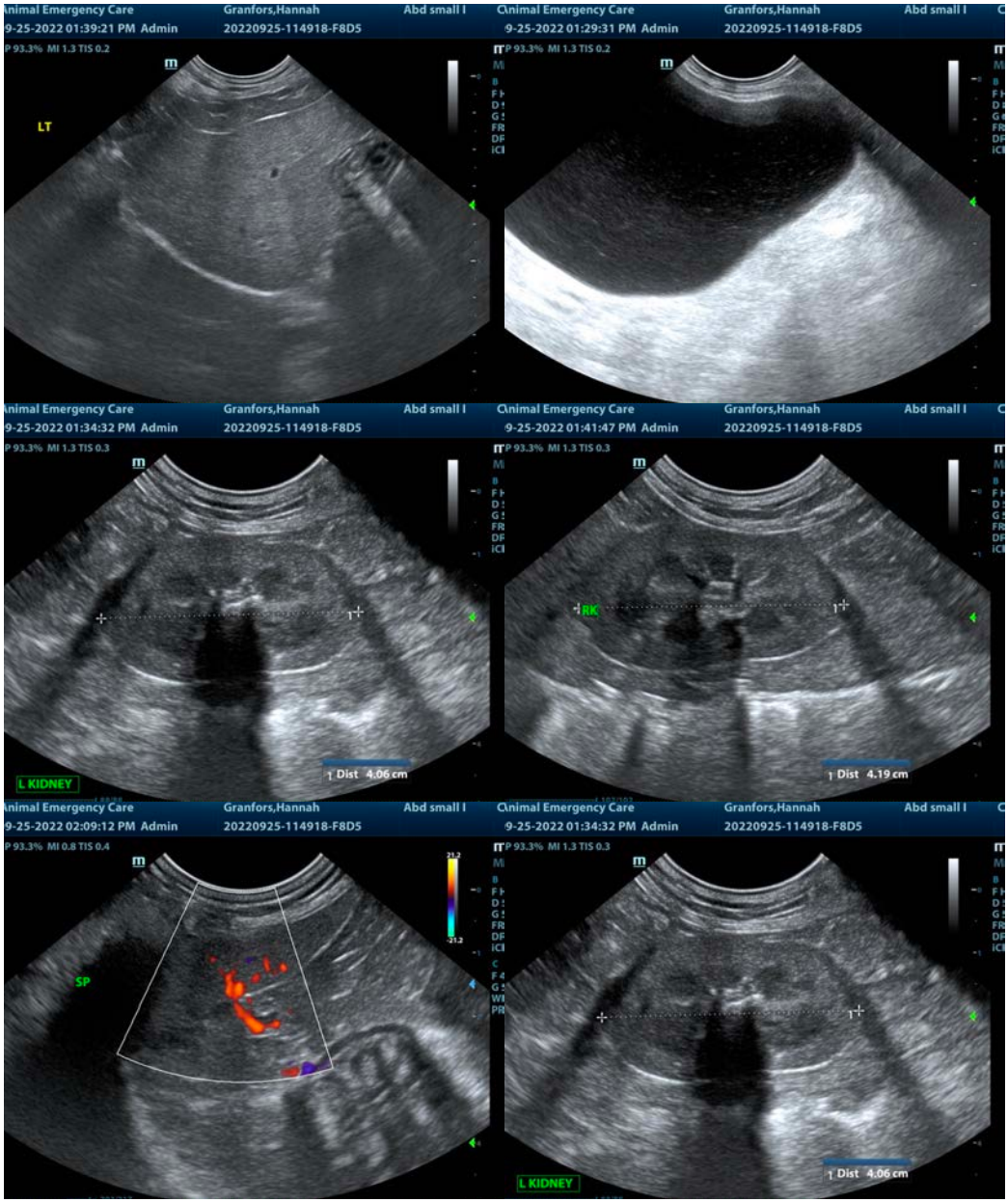


**The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.**

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, Cert. IVUSS, CEO of SonoPath.com

info@SonoPath.com