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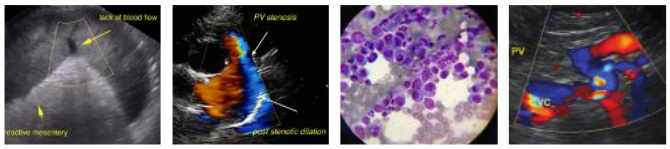

SonoPath.com
1-800-838-4268 info@sonopath.com

PATIENT

Sam Jordan

SPECIES

Canine

BREED

Labrador Retriever

SEX

Intact Male

AGE

8 Years

WEIGHT

110 Pounds

INTERPRETED BY

Eric Lindquist, DMV DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Kalenius

HOSPITAL NAME

Willamette VH

REFERRING VET

Dr. Couser

INVOICE

00

DATE

2/21/22

PRESENTING CLINICAL SIGNS

History: Presented at 4 am this morning with 2-day history of right hind lameness and edema (R hind leg and scrotum), decreased appetite, yellow BM and straining to defecate or urinate and drooling. CURRENT MEDICATIONS/SUPPLEMENTS: _Apoquel, gabapentin, immunotherapy, cyclosporine 250mg; fluoxetine; CBD; Acepromazine; anti itch sprays and ointments History of Atopy Admitted for diagnostics U cath placed and started on IV fluids.

Abnormal PE/Chem/CBC/UA Results: Temp 104.1 on presentation. PE Quiet, slightly sedate on hydro. MM pnk / mild ptyalism. Tachycardia and tachypnea. ABD tense with large firm painful mass effect caudal abdomen. U cath present dark yellow to brown urine. Scrotal and pelvic limb distal edema. Abmulatory but weak / lethargic. Overweight. Severely pruritic. Intake labs: CBC - HCT 27.3%, WBC 19.56k, Neut 15.64k, suspect bands, Mono 1.65k, rest wnl Chem17 - Crea 0.7, BUN 6, ALKP 1785, Chol 328, rest wnl. EPOC - Crea 1.91, Glu 131, Na 139, LAC 1.67, BUN 7, HCT 30% UA - USG >1.050, dipstick: pro 1+, Bil 1+, rest neg/normal. Sedivue: WBC 2/hpf, RBC 2/hpf, suspect cocci on automated sedivue(not seen on manual slide review), CaOxDi Crystals >50 /hpf, struvite crystals <1/hpf, suspect non-hyaline casts. FNA of free abdominal fluid: Neutrophils, RBCs some bacteria. Full cytology analysis pending

ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN

Urinary System

The **urinary bladder** was presumed to be empty, obscured by reactive mesentery. Catheter appeared to be present in an empty bladder and/or prostate, could not be differentiated, owing to lack of underlying urine filling and reactive mesentery.

The **left kidney** 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 left kidney measured 6.94 cm.

The **right kidney** measured 7.7 cm. A cortical infarct was noted at the caudal pole of the right kidney with regional inflammation. Blunting of the caudal pole noted.

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 left adrenal gland measured 0.78 cm. The right adrenal gland measured 1.0 cm at the cranial pole and 0.8 cm at the caudal 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 were noted.

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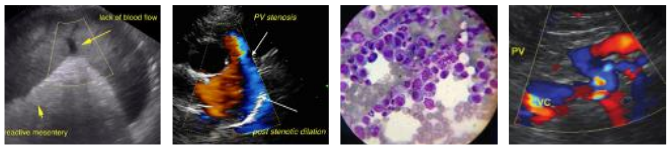

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Liver

The **liver** revealed slight increased portal markings. Slight free fluid was noted between the liver lobes. Enhanced mesentery was noted between the liver lobes. The gallbladder was mildly echogenic.

Gastrointestinal

The **stomach** revealed minor retention of ingesta. The small intestine revealed minor areas of thickening without significant pathology.

Pancreas

The **pancreas** was heterogeneous, hypoechoic and irregular, primarily in the left limb.

Free Fluid

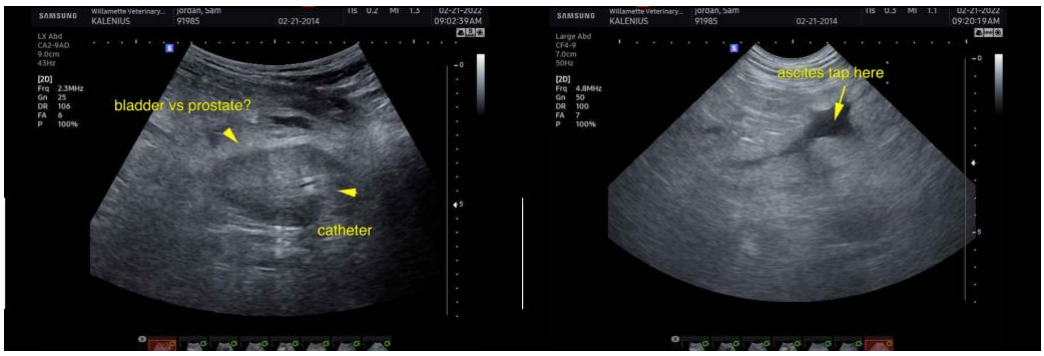
Minor areas of free fluid were noted and the cranial and caudal **abdomen**. Reactive mesentery obscured various portions of the caudal and cranial abdomen. Underlying pathology may be obscured. Enhanced mesentery noted in the portal hilus. The caudal abdomen revealed an approximately 5.0 cm area of mixed hyperechoic and hypoechoic mesentery with underlying hypoechoic presumed lymph nodes that were distorted and irregular with regional free fluid.

ULTRASONOGRAPHIC FINDINGS

- Multifocal steatitis pattern in the caudal and cranial abdomen
- Cholangitis liver pattern
- The lower urinary tract was undefined
- Age-related renal changes
- Stomach ingesta
- Heterogeneous pancreas

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Underlying lymphomatosis, mastocytosis, carcinomatosis all possible. I recommend abdominocentesis of the free fluid with cytospin to assess for neoplastic cells versus evidence of peritonitis. Plasma expanders and broad-spectrum antibiotics are warranted in the meantime. Recheck sonogram in 24-48 hours, depending upon clinical progression and cytology results.



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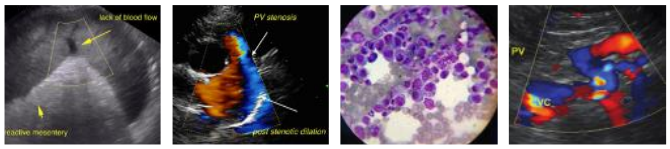

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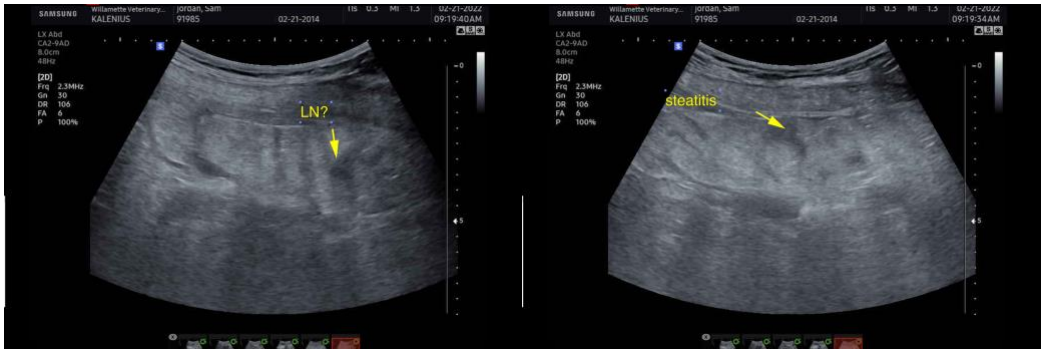

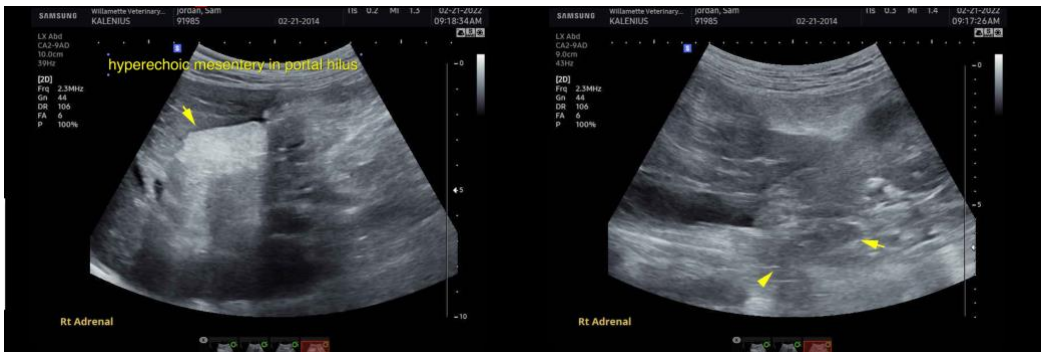

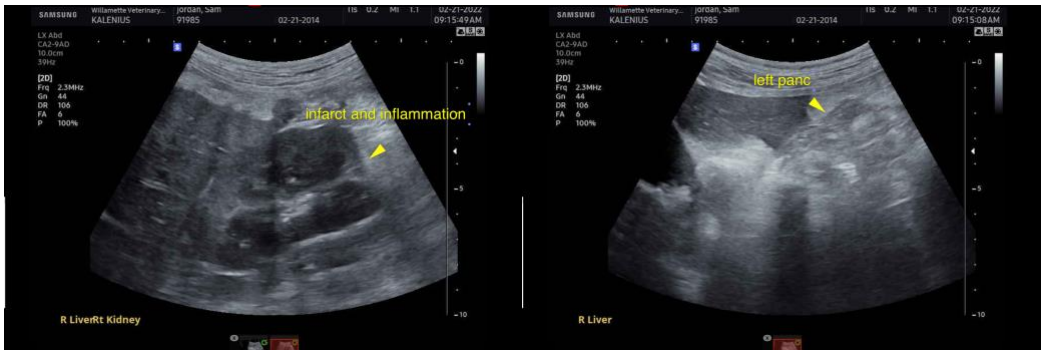

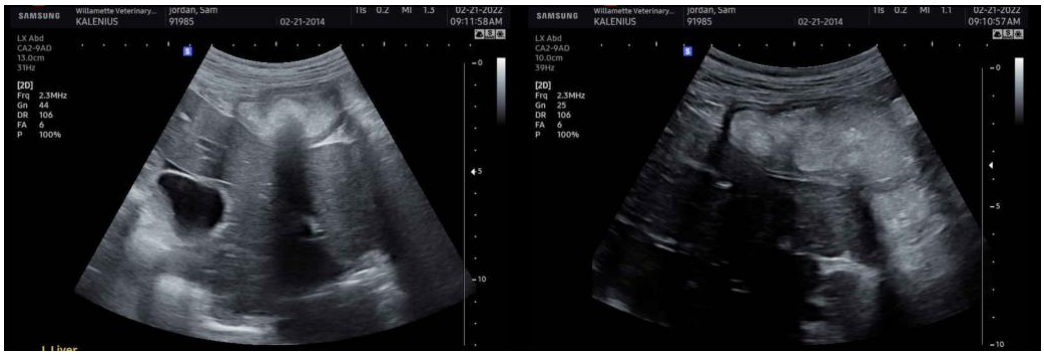

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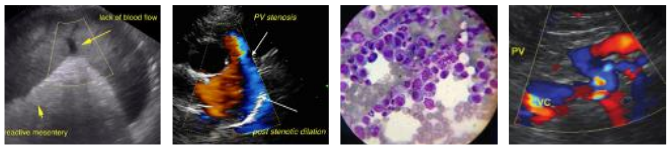

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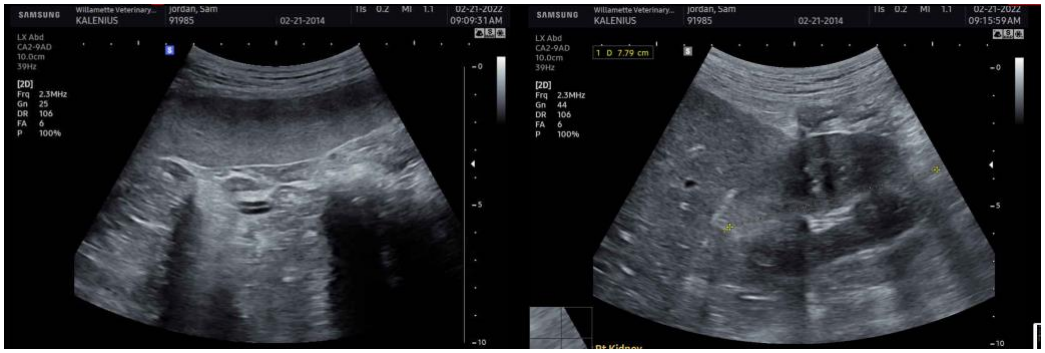
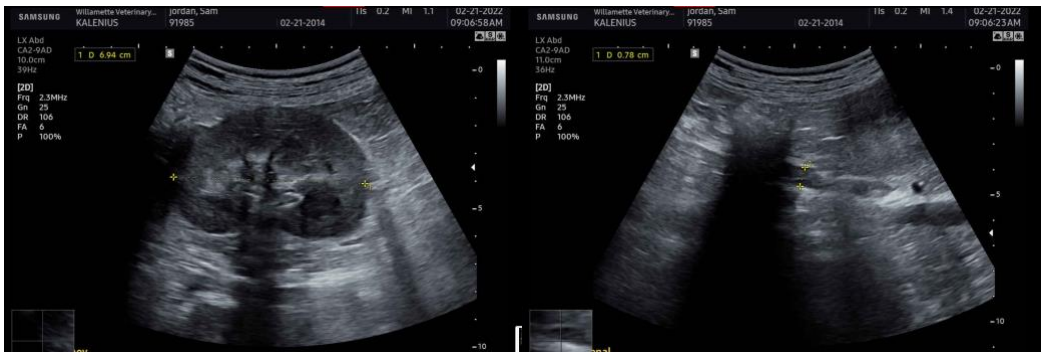




The information and recommendations provided are based on the images presented by the referring veterinarian. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

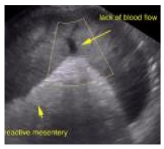
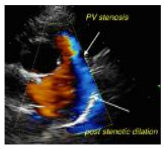
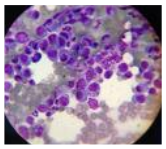
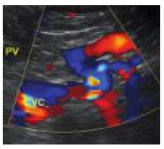
Thank you for this referral. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance please contact me.

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

Fever of Unknown Origin

http://www.sonopath.com/FUO

Description: The definition of a fever of unknown origin (FUO) has not been clearly defined for animals. Currently, it is either understood to be a fever that does not resolve within the period one would expect for a "self-limiting infection" being treated with appropriate antimicrobial therapy, or that for which an underlying diagnosis has not been determined despite considerable diagnostic effort. The common causes of FUO were summarized concisely in a presentation at the American College of Veterinary Internal Medicine 2004 Forum. The presenters synthesized information from three veterinary papers on the subject, which suggested the following:

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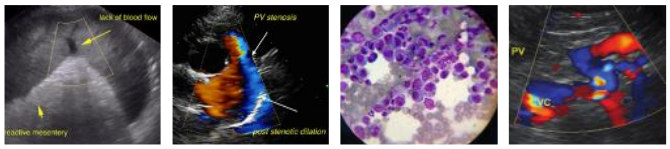
Final Diagnosis	Bennett (dogs & cats)	Dunn and Dunn (dogs only)	Lunn (dogs & one cat)	Total
Infection	21	16	10	47
Immune	18	22	6	46
Bone marrow disease	4	22	2	28
Neoplasia (outside marrow)	0	10	2	12
Miscellaneous	2	12	2	16
No diagnosis	0	19	2	21
TOTALS	45	101	24	170

The types of infection diagnosed in this case series were varied, ranging from discospondylitis (8 cases), blastomycosis (6), and bacterial endocarditis (4), to leishmaniasis (1), prostatitis (1), and *Ehrlichia canis* infection (1); a multitude of other infectious causes also fell within the spectrum. Of the cases in which immune-mediated disease was found, 44% had immune-mediated polyarthritis. Bone marrow diseases included myeloproliferative disease, myelodysplasia (8), lymphocytic leukemia (8), myeloma (3), chronic granulocytic leukemia (3), lymphoblastic leukemia, and malignant histiocytosis. The types of neoplasia located outside the bone marrow included lymphoma (6), metastatic disease (2), and neoplasms of the lung, spleen, and stomach. Finally, miscellaneous diseases included hypertrophic osteodystrophy (6), meningitis (3), portosystemic shunt (3), lymphadenitis (2), panosteitis, and intervertebral disc disease. Overall, the most common causes across all cases were polyarthritis (44), lymphoid neoplasia (15), discospondylitis (8), myelodysplasia (8), hypertrophic osteodystrophy (6), and blastomycosis (6).

Clinical Signs: Animals usually present with either persistent or waxing and waning fevers ranging from 103ºF to 106ºF. Other clinical signs depend on the underlying cause of the fever. Careful and thorough physical examination is required to assess potential causes.

Diagnostics: FUO etiologies are partly related to geography, and thus locale or travel history should factor into a practitioner's diagnostic approach. A patient's lifestyle may also provide clues regarding exposure to certain etiologic agents. Therefore, conducting a thorough history can unveil important pieces of the diagnostic puzzle. Physical examination is especially important and should include an inspection of all accessible lymph nodes, palpation and movement of the joints, a fundic examination, a neurological evaluation, spinal and limb palpation and range of motion tests, and a rectal examination.



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A minimum database should include a CBC reviewed by a clinical pathologist, as well as a biochemical profile and urinalysis. Retroviral testing should also be considered in cats. In areas where tick-borne disease is prevalent, in-house testing should be performed early. Advanced laboratory work can include: urine culture, blood culture, and infectious disease panels (PCR and/or serology). In dogs, one may screen for the following infectious agents: *Ehrlichia* spp., *Borrelia burgdorferi*, Rock Mountain Spotted Fever, *Bartonella* spp. (culture and PCR), and *Leptospira* spp. in cases of hepatic or renal involvement. In cats, one should evaluate for FeLV, FIV, feline infectious peritonitis (FIP) virus, toxoplasmosis, *Hemoplasma* spp. (*Mycoplasma*), and *Bartonella* spp. (culture and PCR). Testing for *Ehrlichia* spp., *Rickettsia* spp., and *Anaplasma phagocytophilum* can also be considered. A fungal assay is indicated if the patient lives in or has had exposure to a region with a higher incidence of fungal disease. Other infectious disease tests may be performed depending on the geographical location of the pet. Screening for *Brucella* should be done in breeding dogs. Immune-mediated disease screening can include a Coomb's test, a slide agglutination test (if the patient is anemic), and an antinuclear antibody (ANA) test. Immune disease is often a diagnosis of exclusion.

Imaging should include thoracic radiographs, abdominal ultrasound, and/or abdominal radiographs. Ultrasound can be very useful for assessing evidence of cholangiohepatitis, pyelonephritis, chronic urinary tract infection, abscess formation, peritonitis, and neoplasia; it also permits an examination of the intra-abdominal lymph nodes. An echocardiogram can offer assessment for vegetative endocarditis, whereas spinal radiographs offer assessment for discospondylitis. In cases where all other testing has proven negative and the patient has not responded to broad-spectrum antibiotics and supportive care, arthrocentesis should be considered to evaluate for septic joint disease, immune-mediated polyarthritis, and infectious disease. Finally, one can consider assessing the cerebrospinal fluid for meningoencephalitis, GME, and meningitis/arteritis. A bone marrow exam should be performed if blood dyscrasias are noted on the CBC.

Treatment: Treatment of the fever depends entirely on the underlying cause. Ideally, a thorough diagnostic plan will yield a diagnosis that will guide the appropriate therapeutic course. However, if an exhaustive approach has not produced a definitive diagnosis and there is no response to broad-spectrum antibiotics, trial therapy with immunosuppressive agents such as prednisolone can be considered to treat presumed immune-mediated diseases. Given the potential for negative sequelae should an underlying infection be present, one must be certain that the investigation is thorough and monitor the patient's response carefully.

Conclusion: If a documented fever has not responded to antibiotics, antipyretics, or general nursing care, it is important to obtain a diagnosis to guide more specific treatment. A systematic physical examination and thorough history-taking will help inform further diagnostics in addition to what is revealed by the minimum database.

References:

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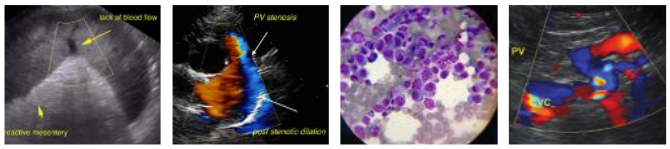
Dunn KJ, Dunn JK. Diagnostic investigations in 101 dogs with pyrexia of unknown origin. *J Sm Anim Pract* 1998;39(12):574-80.



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Flood J. The diagnostic approach to fever of unknown origin in dogs. *Compend Contin Educ Vet* 2009;31(1):14-21.

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Lunn KF. Fever of unknown origin: appropriate choice of diagnostic tests. Proceedings from the American College of Veterinary Internal Medicine, Minneapolis, MN, June 9-12, 2004.