



PATIENT PRESENTING CLINICAL SIGNS

Sacha Acevedo

SPECIES

Canine

BREED

Dachshund

SEX

Intact Female

AGE

15 Years

WEIGHT

13.4 Pounds

INTERPRETED BY

Eric Lindquist, DMV

DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Ferrer

HOSPITAL NAME

Paseos Vet Center

REFERRING VET

Dr. Alma Alicea

INVOICE

43285

DATE

6/19/23

Presented as a referral for an abdominal ultrasound to evaluate vomiting, diarrhea, and was lethargic since 6/18/23. Sasha is 14 y/o F/S dachshund that presented to Emergency Clinic on 6/18 with profuse bloody diarrhea, fever of 106, pain and severe weakness. started vomiting (June 16th) and taken to regular vet (June 17th) found to have moderately elevated liver enzymes and treated as outpatient but decompensated June 17th on PM and Sunday (June 18th) on AM was brought in as ER. Pt has hx of cardiac disease and is on vetmedin, lasix, spironolactone, enalapril and amlodipine for this. 6/19 - she is better. no v/d since arrival. temp normal today 101.9 F. RR has been stable 24bpm. MM pink. BP 220mmHg. lungs auscult wnl. abdomen mildly tense on palpation, but no complaint of pain. still weak and reluctant to stand, but with help she will stay standing. rectal - pasty light brown colored feces with gas. full anal sacs, easily expressed. BG check - 60 mmHg. add 5% dextrose to Plasmalyte. Problems 1. vomiting 2. diarrhea with blood 3. fever 106F 4. moderately elevated ALT/ALKP/GGT 5. hx cardiac disease 6. hypoglycemia - sepsis, hepatic dz, pancreatitis, less likely addisons, toxic, etc Plan 1. abd. US - transfer to Paseos for this - owner will call and make arrangements for pet taxi to pick up, he will call us back to confirm this 2. continue NPO until do Abd. US, then start offering bland diet 3. continue metronidazole 7.5mg/kg iv bid 4. continue unasyn 22mg/kg iv tid 5. continue baytril 10mg/kg iv sid 6. continue monitoring temp BID 7. monito rRR q 4 hrs. 8. decrease fluids maint with close monitoring of RR 9. BP daily - 220mmHg today - but she was very nervous? repeat later. 10. continue cerenia 1mg/kg iv sid. 11. continue pantoprazole 1mg/kg vi sid 12. continue cardiac meds - spironolactone 25mg 1/4 tab po BID, vetmedin 2.5mg 1 tab po bid, furosemide 12.5mg 1/2 tab po bid, enalapril 5mg - 1 tab am, 1/2 tab PM, amlodipine 2.5mg 1/4 tab po sid. 13. should continue hospit for at least 24 more hrs - can stay in paseos if possible, if not can transfer back. 14. BG 60mmHg. Monitor BG hourly until normalized, then TID. 15. 50% dextrose bolus - 0.5 ml diluted in 3 ml saline slow over 15min. then add 5% dextrose to P-lyte. guarded px.

Abnormal PE/Chem/CBC/UA Results: X-Rays: cardiomegaly and liver lobe appeared large. CHEM: ALT 714 U/L, ALP 494 U/L, GGT 50 U/L

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 were noted. Ureteral papillae were normal. The pelvic urethra was imaged 2.0 cm beyond the cystourethral junction.

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 cortex 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 5.36 cm.

The **right kidney** measured 5.6 cm with trace pyelectasia and subcapsular hypoechoic fluid accumulation. Some loss of corticomedullary definition noted. Moderate degenerative cortical changes.

Adrenal Glands

Both **adrenal glands** were measurably normal yet slightly swollen. The right adrenal gland measured 1.77 cm x 0.75 cm. The left adrenal gland measured 2.13 cm x 0.82 cm.



PATIENT *Spleen*

Sacha Acevedo The **spleen** was mildly enlarged, swollen, with uniform parenchyma, measuring 1.5 cm.

SPECIES *Liver*

Canine The **liver** revealed a hyperechoic nodule consistent with lipid plaque or nodular hyperplasia. Minor non-specific swelling. Slight increased portal markings. The gallbladder wall was slightly echogenic, measuring 0.14 cm. Relatively normal to slightly excessive thickness. Minor gallbladder debris and polyps noted.

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Gastrointestinal

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The **gastric** wall was thickened in this patient with increased submucosal echogenicity and thickness with muscularis hypertrophy. The lumen was empty. No overt neoplastic criteria. However, some duodenal spasming was present.

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Pancreas

The **pancreas** presented hyperechoic parenchymal changes consistent with remodeling and past episodes of pancreatitis.

WEIGHT

13.4 Pounds

ULTRASONOGRAPHIC FINDINGS

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

- Subjectively benign vacuolar hepatopathy/inflammatory hepatopathy pattern
- Gastroduodenitis and pancreatic remodeling
- Mild bilateral adrenal hypertrophy
- Mildly enlarged, swollen spleen
- Age related renal changes with cortical cysts

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

IMAGING PERFORMED BY

Dr. Ferrer

This is a non-specific and fairly frequent presentation for this age and breed. FNA of the liver could be considered. Sepsis is a strong potential, given the hypoglycemia reported. GI protectants, plasma expanders, and a clinical trial of Enrofloxacin/Clindamycin or similar combination recommended.

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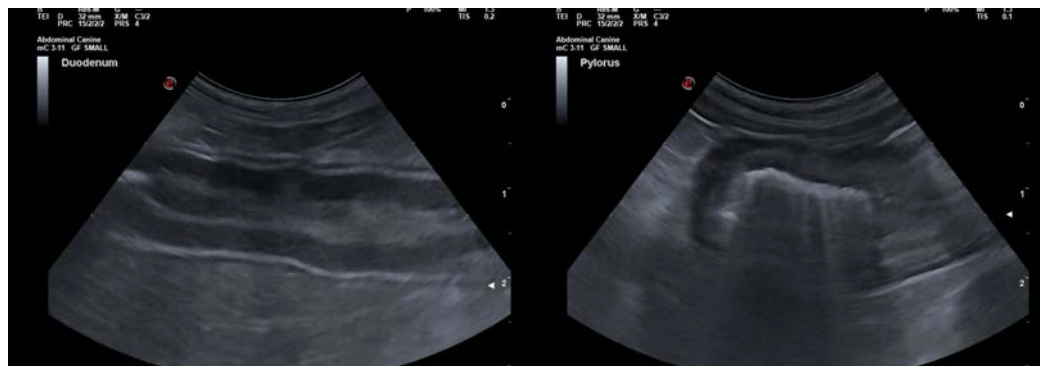
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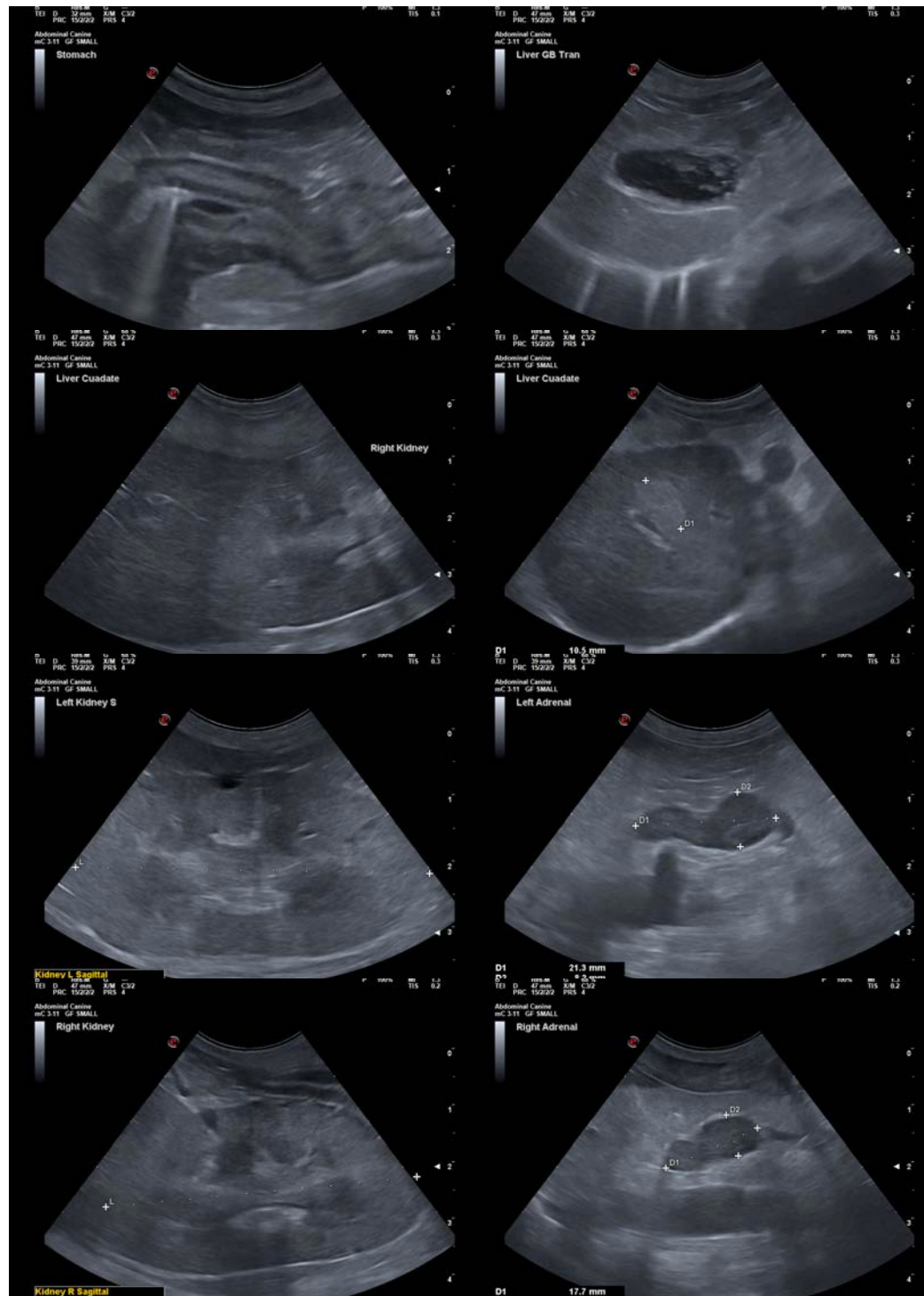
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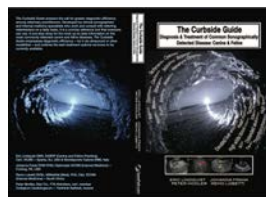


The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

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



The following is an applicable excerpt from the *Curbside Guide to Diagnosis & Treatment of Sonographic Disease* offered by [SonoPath.com](http://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>

Fever of Unknown Origin

<http://www.sonopath.com/FUO>



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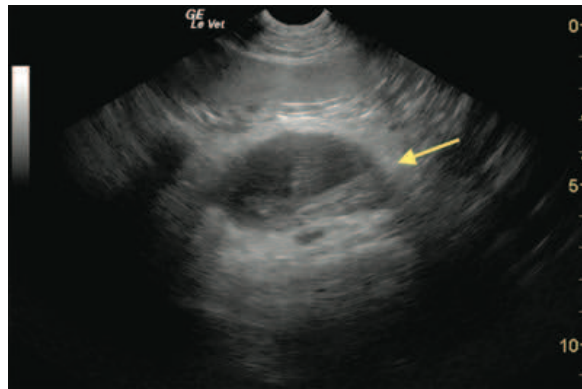
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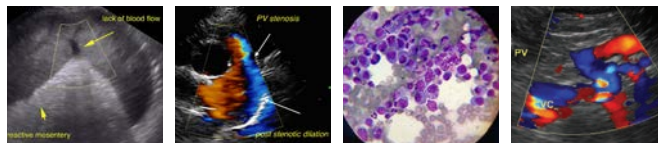


Long axis of the mid-abdomen in a dog with an omental abscess after foreign body penetration from the gastrointestinal tract. The hypoechoic necrotic center of the lesion is surrounded by a thick echogenic capsule and hyperechoic mesenteric fat (arrow) indicating focal peritonitis. The linear echogenic needle (5 cm depth) is barely visible owing to the density of the purulent material contained within the abscess.

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:

Final Diagnosis	Bennett (dogs & cats)	Dunn and Dunn (dogs only)	Lunn (dogs & one cat)	Total	Percent
Infection	21	16	10	47	28
Immune	18	22	6	46	27
Bone marrow disease	4	22	2	28	16
Neoplasia (outside marrow)	0	10	2	12	7
Miscellaneous	2	12	2	16	9
No diagnosis	0	19	2	21	12
TOTALS	45	101	24	170	99

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



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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).

SPECIES

Canine

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

BREED

Dachshund

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.

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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.

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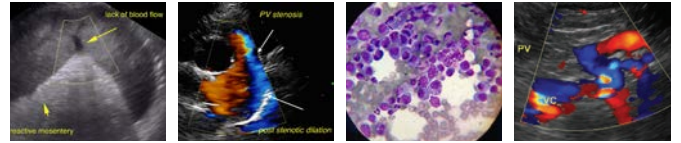
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Treatment: Treatment of the fever depends entirely on the underlying cause. Ideally, a thorough diagnostic plan will yield a diagnosis that will guide the appropriate therapeutic course. However, if an exhaustive approach has not produced a definitive 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.



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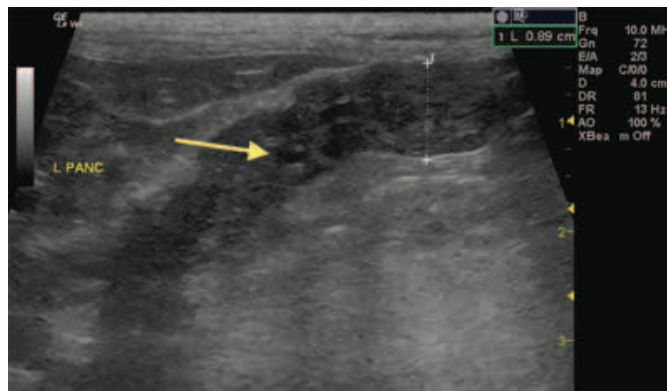
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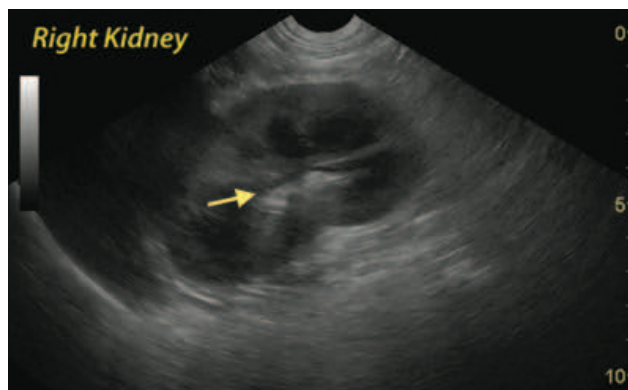
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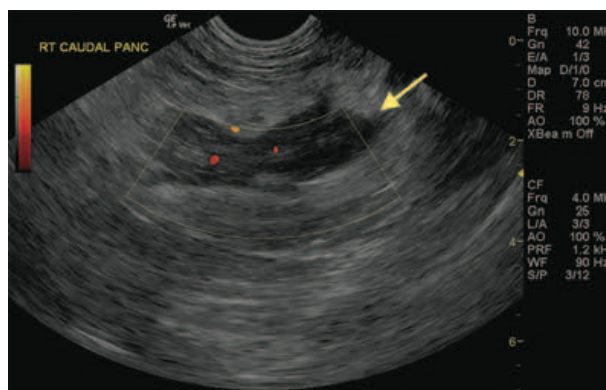
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Long axis of the left pancreatic limb (between calipers) in a cat with pancreatitis after undergoing a renal transplant. Note the decrease in echogenicity and mild loss of regular echotexture of the swollen and irregularly contoured pancreas. Also note the mild dilation of the pancreatic duct (arrow). Focal peritonitis is evident by increased echogenicity and loss of the linear echotexture of the surrounding mesentery.



Long axis of the right kidney in a dog with pyelonephritis. Note the increased echogenicity and irregular outline of the renal crest and diverticuli and the mild dilation of the renal pelvis (arrow).



Long axis of the right pancreatic limb in a dog with acute pancreatitis. The swollen hypoechoic pancreas is embedded in hyperechoic mesenteric fat (arrow). Note the regional differences in blood flow intensity within the parenchyma as demonstrated by Power Doppler interrogation compatible with multifocal disruption of vascularization as a sequela of the severe inflammation.

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 cats. *Compend Contin Educ Vet* 2009;31(1):26-31.

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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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Lappin MR. The role of blood borne pathogens in feline fever of unknown origin. Proceedings from the American College of Veterinary Internal Medicine, Denver, CO, June 15-18, 2011.

Lunn KF. Fever of unknown origin: a systematic approach to diagnosis. *Compend Contin Educ Vet* 2001;23(11):976-92.

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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.

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