



PATIENT

Odie Gudowski

SPECIES

Canine

BREED

Golden Retriever

SEX

Intact Male

AGE

1 Year

WEIGHT

28.7 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott

HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21

PRESENTING CLINICAL SIGNS

History: Presented for a 4-day history of vomiting and a fever of unknown origin. Had also presented here with facial angioedema a few days ago. Has not been able to keep down food or water for the past 2 days. Historically was noted to be eating clumping cat litter prior to the onset of clinical signs. Had been given a Maropitant injection prior to presentation which did not stop the vomiting. Has had an elevated WBC count for a month

Abnormal PE/Chem/CBC/UA Results: Ecchymotic, hyperemic rash (non-pruritic over most of the trunk. Otherwise unremarkable. Looks vaguely reminiscent of a mild vasculitis. Neutrophilic inflammation and monocytosis

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 prostate was uniform, measuring 2.71 cm- no evidence of pathology.

The **kidneys** revealed normal size and structure, corticomedullary definition and ratio for this age. The cortices presented largely uniform texture with normal echogenic relationship to liver and spleen. Medullary structure differed distinctly from the cortex and no evidence of pelvic dilation was present. The capsules were acceptably uniform without significant irregularities. The left kidney measured 7.0 cm. The right kidney measured 6.0 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 left adrenal gland measured 0.5 cm. The right adrenal gland measured 0.8 cm at the cranial pole and 0.5 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.

Liver

The **hepatic** parenchyma was uniform yet surrounded by free fluid. The gallbladder wall was edematous.

Gastrointestinal

The **gastric** wall was mildly hypertrophied, measuring 0.76 cm. Empty lumen noted. Slight areas of free fluid noted around the upper gastrointestinal tract and liver. Slight luminal chyme noted in the small intestine. Duodenal spasming present with mild transit of chyme. Hyperperistalsis present.



PATIENT

Pancreas

Odie Gudowski

The right limb of the **pancreas** revealed heterogeneous mixed echogenic changes. The left pancreatic base also revealed mixed echogenic changes.

SPECIES

Canine

ULTRASONOGRAPHIC FINDINGS

BREED

Golden Retriever

- Gastroenteritis
- Regional right limb pancreatitis, left pancreatic limb mixed echogenic changes
- Edematous gall bladder and free fluid owing to acute cholangitis or immune mediated issues

SEX

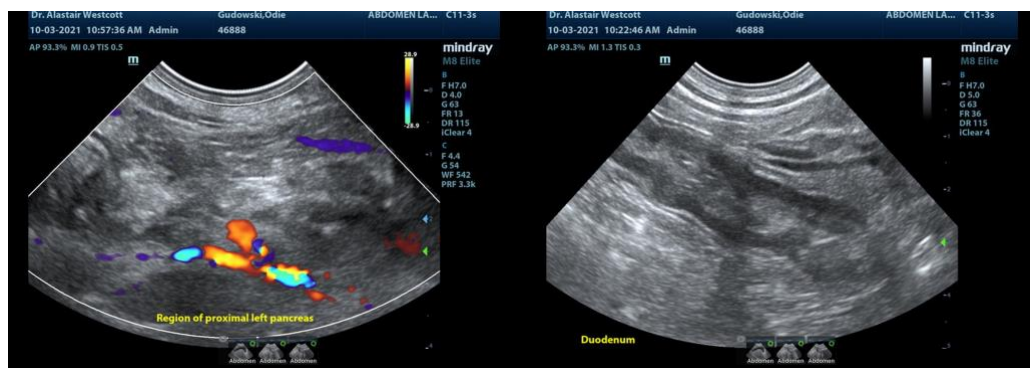
Intact Male

INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS

Free fluid should be monitored carefully in this patient. If possible, ultrasound guided sampling of the free fluid with cytology and culture would be appropriate. Plasma expanders, GI protectants and broad-spectrum antibiotics (such as enrofloxacin/clindamycin combination) all warranted. No evidence of foreign body, however GI upset and cholangitis or immune mediated issues may be playing a role. Full coagulation panel warranted. Leptospirosis titers warranted. Recheck sonogram in 48-hours.

WEIGHT

28.7 Pounds

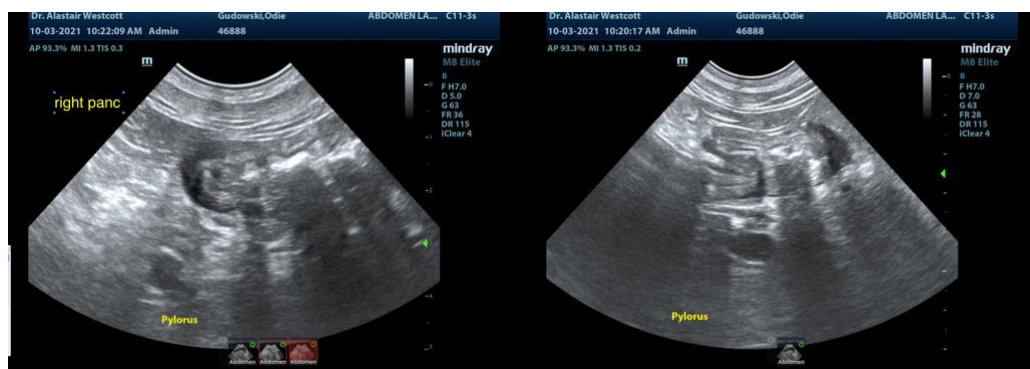


INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott



HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21



PATIENT

Odie Gudowski

SPECIES

Canine

BREED

Golden Retriever

SEX

Intact Male

AGE

1 Year

WEIGHT

28.7 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott

HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

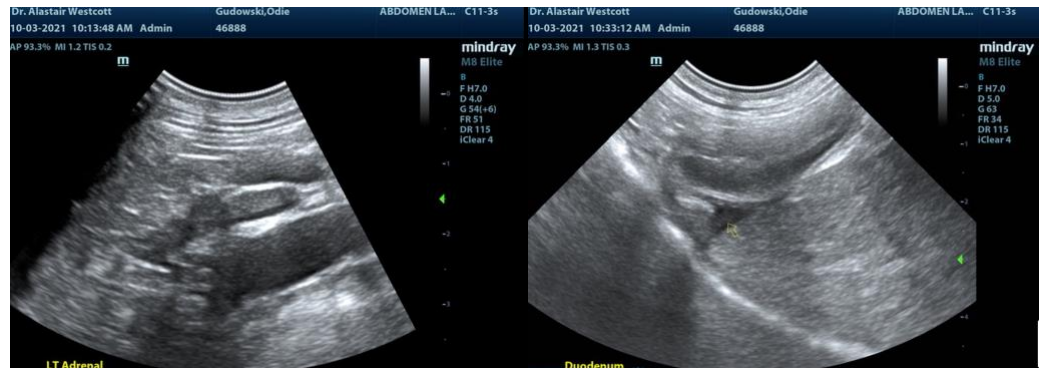
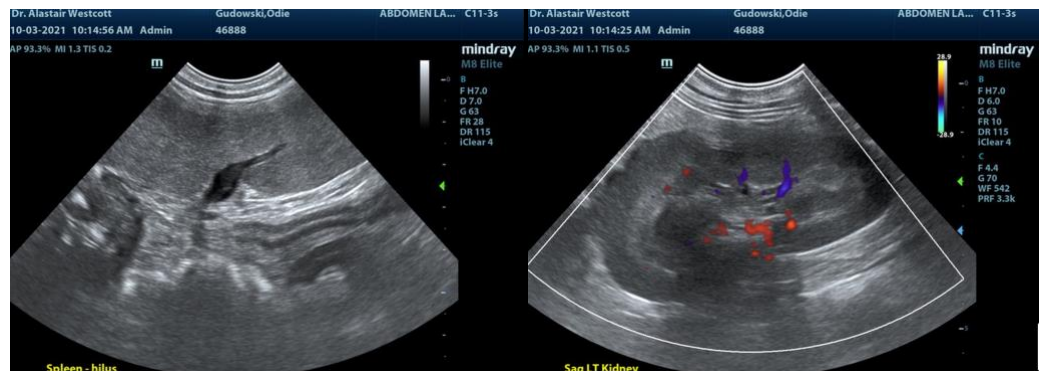
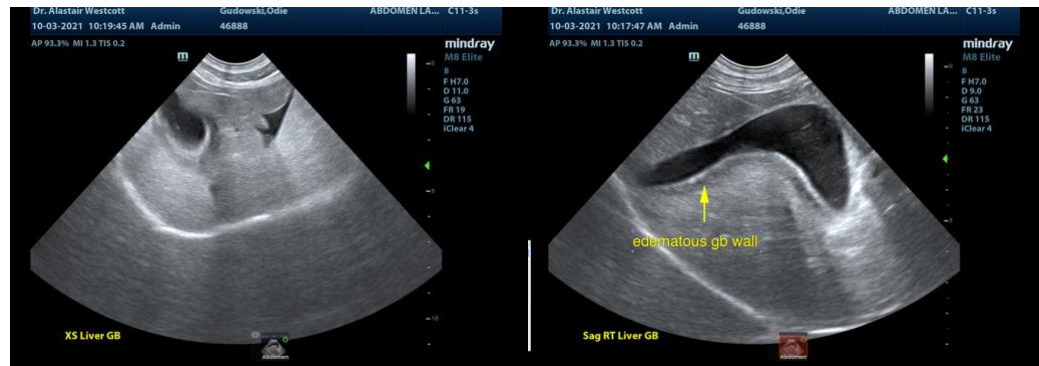
Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21





PATIENT

Odie Gudowski

SPECIES

Canine

BREED

Golden Retriever

SEX

Intact Male

AGE

1 Year

WEIGHT

28.7 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott

HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

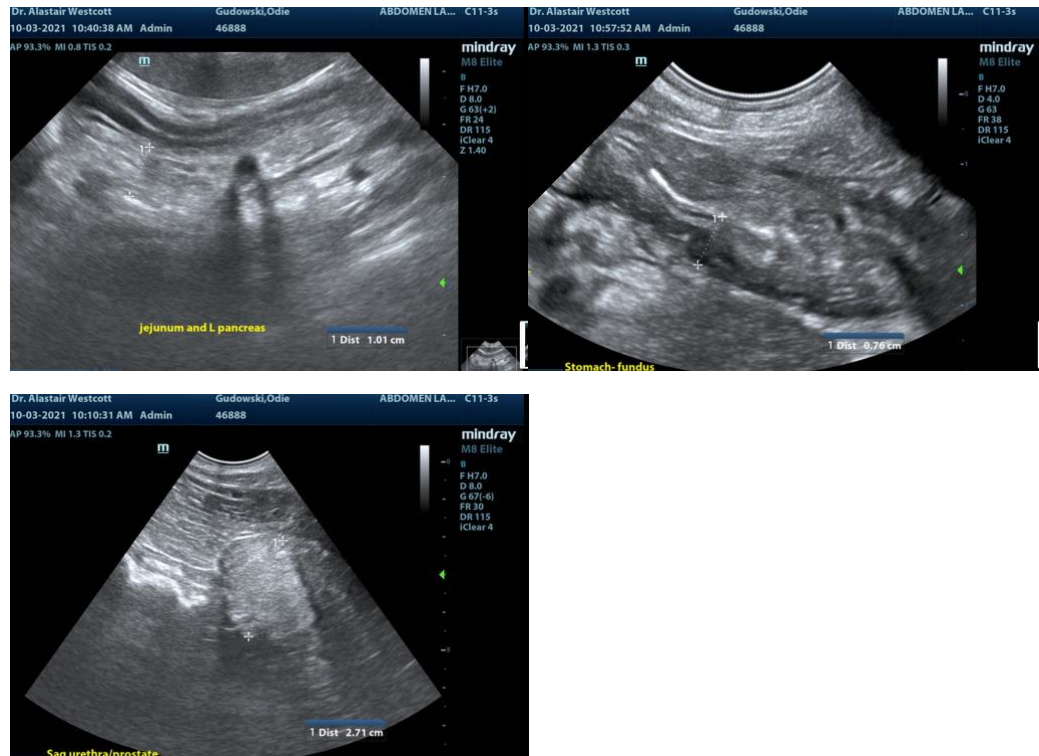
Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21



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:



PATIENT

Odie Gudowski

SPECIES

Canine

BREED

Golden Retriever

SEX

Intact Male

AGE

1 Year

WEIGHT

28.7 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott

HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21

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 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.

Diagnostics: F.U.O 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.



PATIENT

Odie Gudowski

SPECIES

Canine

BREED

Golden Retriever

SEX

Intact Male

AGE

1 Year

WEIGHT

28.7 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott

HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21

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.

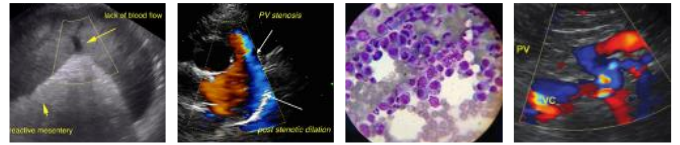
Treatment: Treatment of the fever depends entirely on the underlying cause. Ideally, a thorough diagnostic plan will yield a diagnosis that will guide the appropriate therapeutic course. However, if an exhaustive approach has not produced a definitive diagnosis and there is no response to broad-spectrum 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:

Bennet D. Diagnosis of pyrexia of unknown origin. *In Practice* 1995;17(10):470-81.

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



PATIENT

Odie Gudowski

Flood J. The diagnostic approach to fever of unknown origin in cats. *Compend Contin Educ Vet* 2009;31(1):26-31.

SPECIES

Canine

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

BREED

Golden Retriever

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.

SEX

Intact Male

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

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.

AGE

1 Year

WEIGHT

28.7 Pounds

INTERPRETED BY

Eric Lindquist, DMV
DABVP, Cert. IVUSS

IMAGING PERFORMED BY

Dr. Alastair Westcott

HOSPITAL NAME

Dr. Alastair Westcott,
DVM

REFERRING VET

Dr. Alastair Westcott

INVOICE

13479

DATE

10/3/21