

Oh My Dog, I Think It's Pancreatitis!

Diagnosis and Management for Improved Outcomes

Jill Pomrantz, DVM, DACVIM (SAIM)

November 6th, 2025

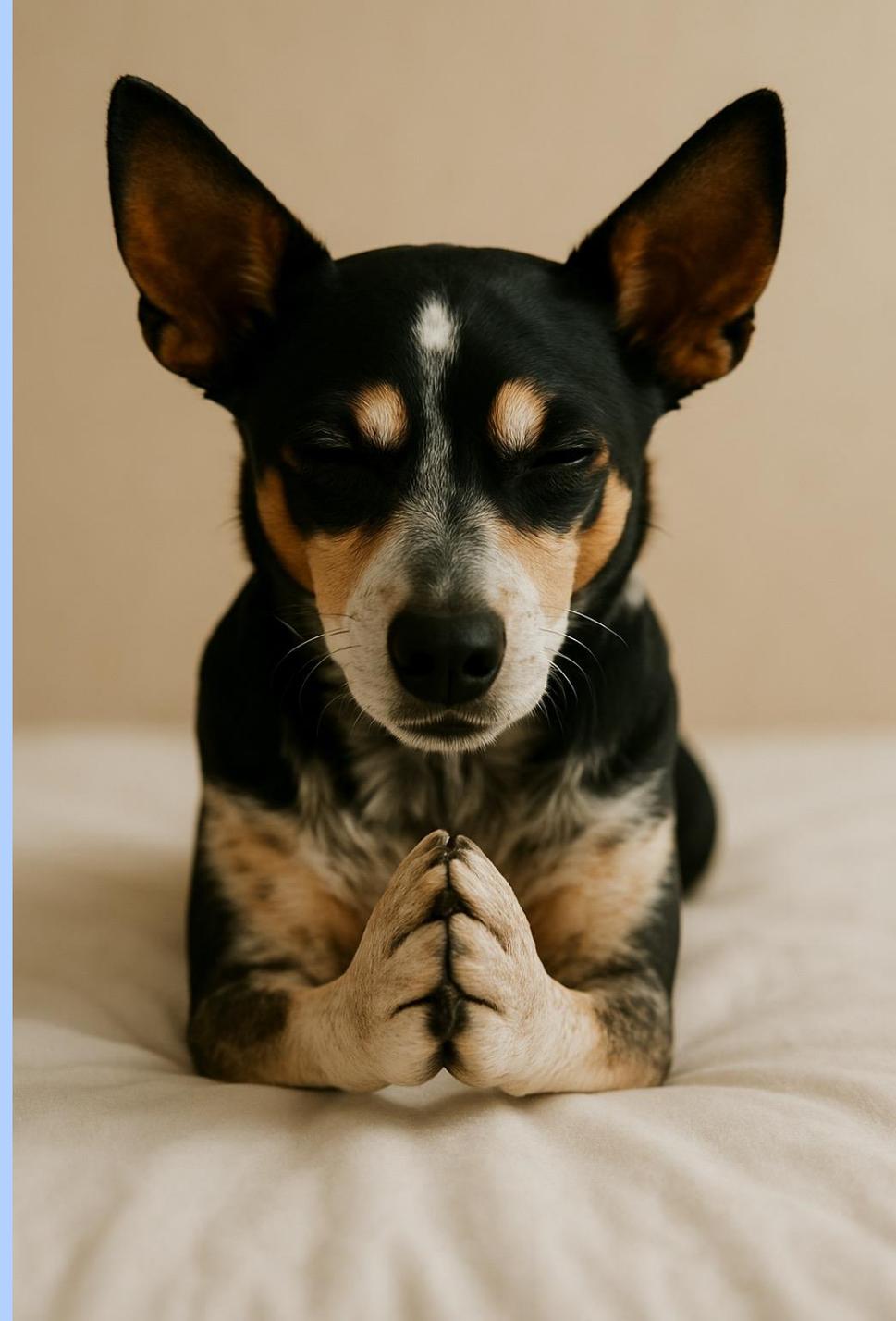


Disclosure:

Full-time Employee of IDEXX

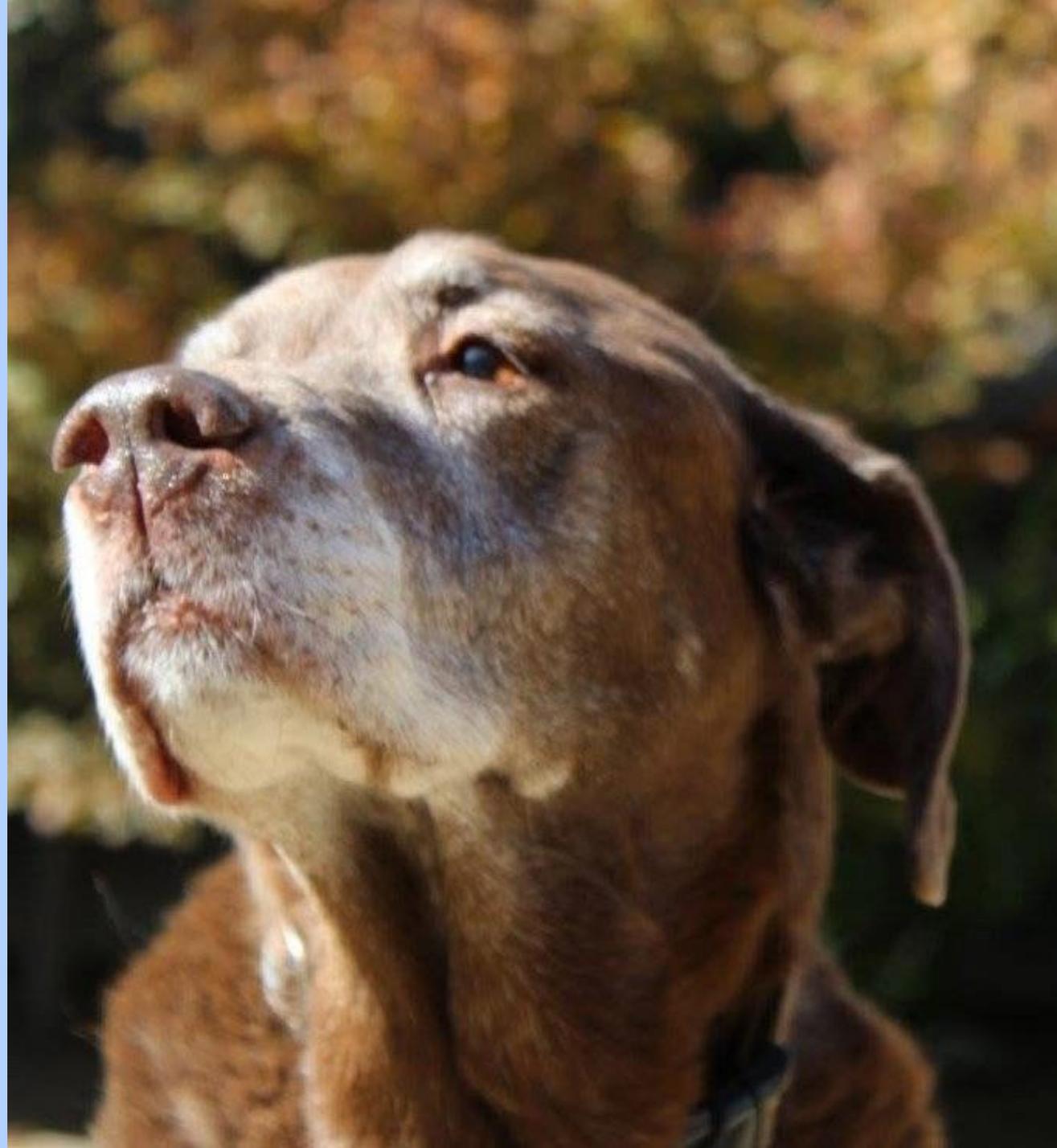
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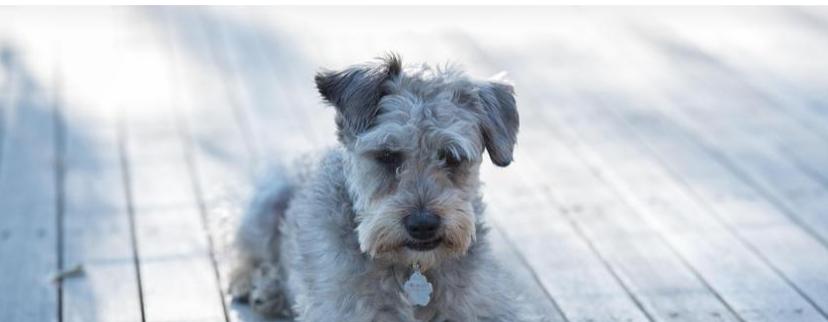
The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical exam and presentation, and laboratory data. With respect to any drug therapy or monitoring program, you should refer to applicable product insert(s) for complete description of dosage, indications, interactions, and cautions. Diagnosis, treatment, and monitoring should be patient specific and is the responsibility of the veterinarian providing primary care. (2025)



Learning objectives

- + Familiarize with pancreatic physiology and pathophysiology
- + Understand the differences between acute and chronic pancreatitis in dogs
- + Recognize clinical picture and when to suspect pancreatitis
- + Understand how to diagnose pancreatitis
- + Understand patient treatment and follow-up
- + Learn from case examples





Benny



Mattie

Photo courtesy of Dr. Muki Laszlow

Signalment

+ 4-year-old, MN schnoodle

+ 15-year-old FS catahoula/boxer mix

History

- + Vomiting x 24 hours
- + Recent diarrhea
- + Very lethargic that evening after visit to urgent care

- + Osteoarthritis
- + Recent dental with extractions
- + Lethargy, vomited once, diarrhea
- + Still eating, but less
- + Owned by a veterinarian 😊

Physical examination

- + T: 100.5°F, P: 180, R: 72
- + +/- hydrated
- + Abdomen: tense and guarded on palpation

- + TPR: within normal limits
- + Hydrated
- + Oral cavity healing well
- + Quiet

Pathophysiology



Pancreatic physiology and pathophysiology

+ Exocrine pancreas

- + Acinar cells produce digestive enzymes

- + Trypsinogen, chymotrypsinogen

- + Lipase, prothrombinase, esterase

- + Amylase, lactase

- + Ribonuclease, deoxyribonuclease

+ Endocrine pancreas

- + Beta cells produce insulin

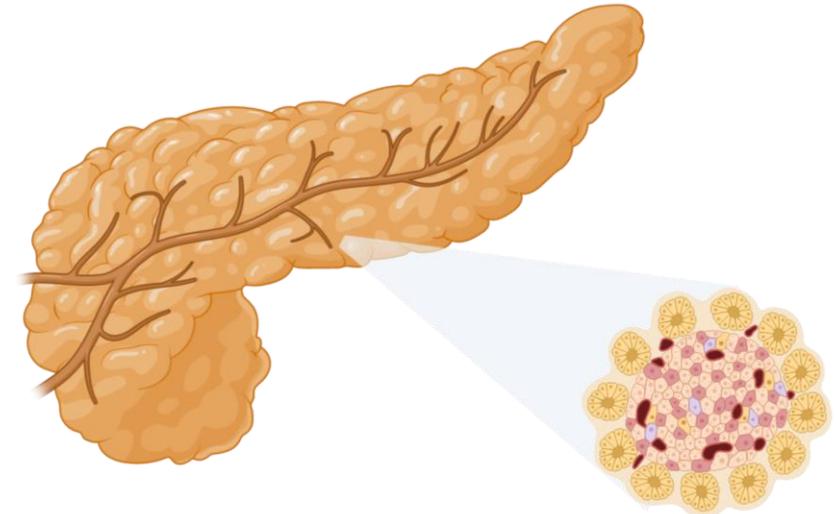


Image courtesy of Dr. Rebekah Mack, BioRender

Karpińska M, Czauderna M. Pancreas-Its Functions, Disorders, and Physiological Impact on the Mammals' Organism. *Front Physiol.* 2022 Mar 30;13:807632. doi: 10.3389/fphys.2022.807632.

Pathophysiology of pancreatitis



Pancreatitis – acute and chronic

Acute pancreatitis

- + An acute inflammatory process that does not lead to permanent changes
 - + **Reversible**
 - + Primary cell type is neutrophils
- + Outcomes
 - + Death
 - + Resolution
 - + Progression to chronic pancreatitis if the inflammation is recurrent or severe



Chronic pancreatitis

- + Continuing inflammatory process accompanied by permanent changes mainly fibrosis and acinar atrophy
 - + Primary cell type is lymphocytes
 - + Acute flare-ups may occur
 - + Often manageable with close monitoring and diet
 - + Some evidence for an autoimmune mechanism in some breeds

Newman S, Steiner J, Woosley K, Barton L, Ruaux C, Williams D. Localization of pancreatic inflammation and necrosis in dogs. *J Vet Intern Med.* 2004;18(4):488-493. doi: 10.1111/j.1939-1676.2004.tb02572.x.

Coddou MF, Blacklaws B, Watson PJ. Clinical Manifestations of chronic pancreatitis in English cocker Spaniels. *J Vet Intern Med.* 2024;38(4):2129-2137. doi: 10.1111/jvim.17100.

How common is pancreatitis?

- + 73 dogs with necropsy for any reason
 - + Examined pancreas
- + Histologic evidence of pancreatitis was identified in 47 dogs (64%)¹
 - + Suppurative or lymphocytic inflammation, necrosis, fibrosis
 - + Pancreatitis visible grossly in only 4/47 dogs (9%)
 - + Only 1 dog had clinically suspected pancreatitis
 - + Fibrosis in 28/47 (59%)
 - + Location was discrete and random vs. diffuse

- + 61 dogs with chronic pancreatitis diagnosed on necropsy
 - + Diagnosis solely on histopathological criteria
 - + Inflammatory changes (neutrophilic or lymphocytic)
 - + Irreversible changes (atrophy and/or fibrosis)
- + 18/61 (29%) of dogs had no clinical signs consistent with pancreatitis.²
 - + Clinical signs defined as vomiting an/or decreased appetite

Clinical Relevance?

1. Newman S, Steiner J, Woosley K, Barton L, Ruaux C, Williams D. Localization of pancreatic inflammation and necrosis in dogs. *J Vet Intern Med.* 2004;18(4):488-493. doi:10.1111/j.1939-1676.2004.tb02572.x.
2. Bostrom RM, Xenoulis PG, et al. Chronic pancreatitis in dogs: A retrospective study of clinical, clinicopathological, and histopathological findings in 61 cases. *Vet Rec.* 2013;195:73-70. doi: 10.1016/j.tvjl.2012.06.034.

Risk factors



Ingestion of fatty meal or snacks



Breed predisposition – acute pancreatitis: Miniature Schnauzer, others; chronic pancreatitis: English Cocker Spaniel, others



Lipid disorder – high triglycerides



Toxins – organophosphate, zinc



Drugs – azathioprine, potassium bromide in combination with phenobarbital, potentiated sulfonamides



Questionable: endocrinopathy – causation or association?



Miscellaneous: Obesity/overweight status, honeybee envenomation

Cridge H, Lim SY, Algul H, et al. New insights into the etiology, risk factors, and pathogenesis of pancreatitis in dogs: Potential impacts on clinical practice. *J Vet Intern Med.* 2022; 36(3):847-864. doi: 10.1111/jvim.16437

Gaskill CL, Cribb AE. Pancreatitis associated with potassium bromide/phenobarbital combination therapy in epileptic dogs. *Can Vet J.* 2000; 41(7):555-558.

Risk factors

Idiopathic

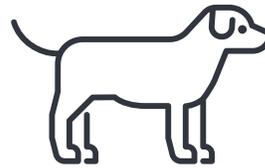
Cridge H, Lim SY, Algul H, et al. New insights into the etiology, risk factors, and pathogenesis of pancreatitis in dogs: Potential impacts on clinical practice. *J Vet Intern Med.* 2022; 36(3):847-864. doi: 10.1111/jvim.16437

Gaskill CL, Cribb AE. Pancreatitis associated with potassium bromide/phenobarbital combination therapy in epileptic dogs. *Can Vet J.* 2000; 41(7):555-558.

Presentation

Clinical Signs

- + Inappetance
- + Diarrhea
- + Vomiting
- + Abdominal pain
- + Chronic pancreatitis often more subtle recurring GI signs but can have acute-on-chronic signs as above



Physical Exam

- + Dehydration
- + Abdominal pain
- + +/- Hyperthermia, hypothermia
- + Evidence of systemic complications
 - + Increased respiratory rate/effort
 - + Neurologic signs
 - + Bleeding
 - + Icterus
 - + Cardiovascular shock

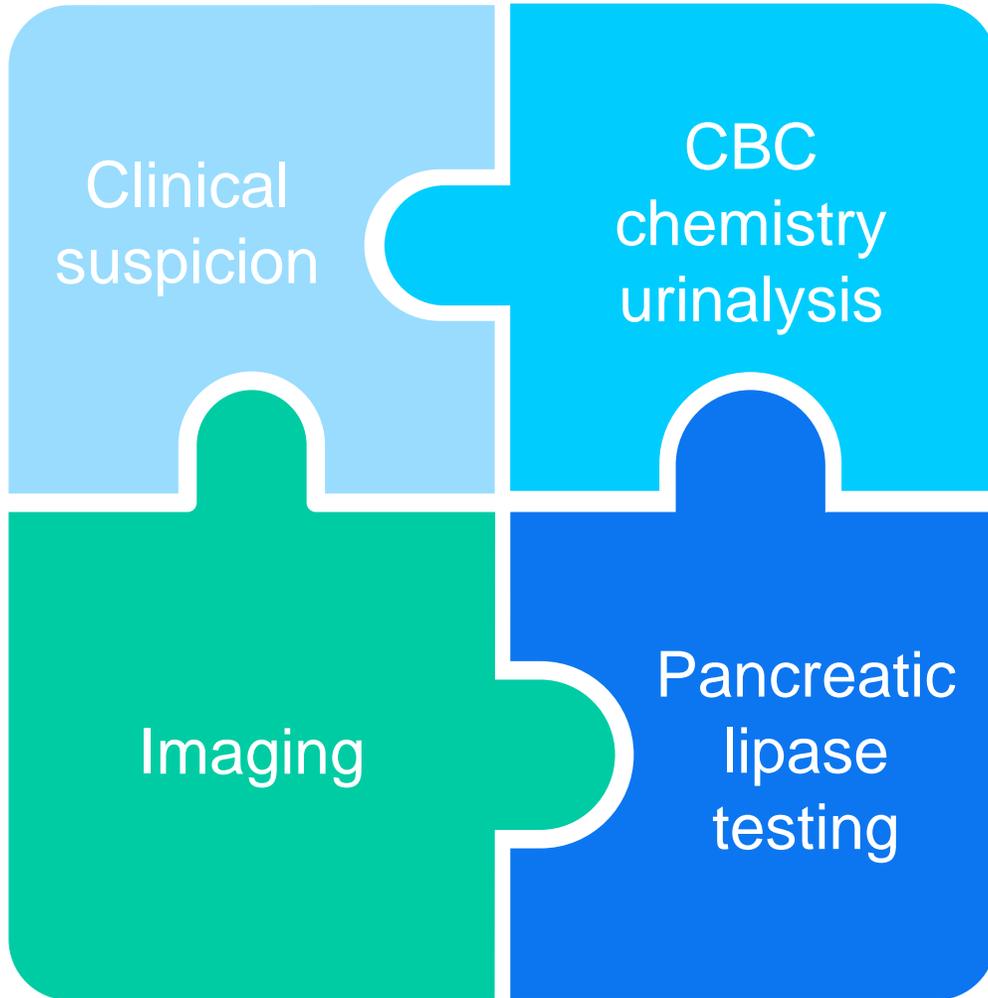
Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med.* 2021; Nov;35(6):2572-2587. doi: 10.1111/jvim.16292.

Cridge H, Scott N, Steiner JM. Risk Factors and Clinical Presentation in Dogs with Increased Serum Pancreatic Lipase Concentrations—A Descriptive Analysis. *Animals (Basel).* 2022;12(12):1581. doi: 10.3390/ani12121581.

Diagnosis



Diagnosis



- + Clinical suspicion
 - + History
 - + Physical examination
- + Suggestive laboratory results
- + Serum biomarkers
- + Imaging
- + (Cytology, histopathology)

Possible clinicopathologic abnormalities

Hematology

- + Hemoconcentration or anemia
- + Stress leukogram
- + Neutrophilia with left shift
- + Thrombocytopenia

Chemistry

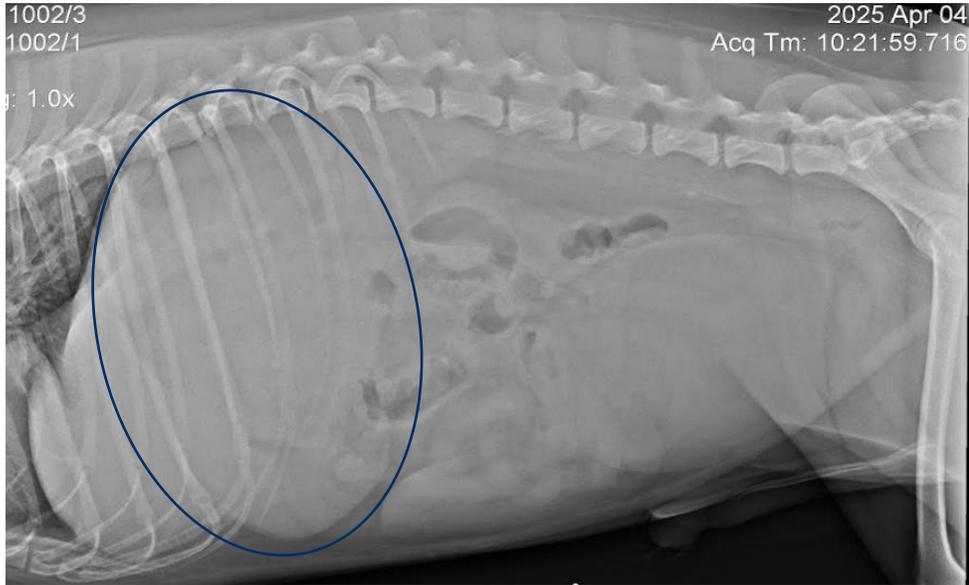
- + Hypoalbuminemia
- + Hypocalcemia
- + Azotemia, elevated SDMA
- + Elevated lipase and amylase
- + Elevated liver enzymes, hyperbilirubinemia

Urinalysis

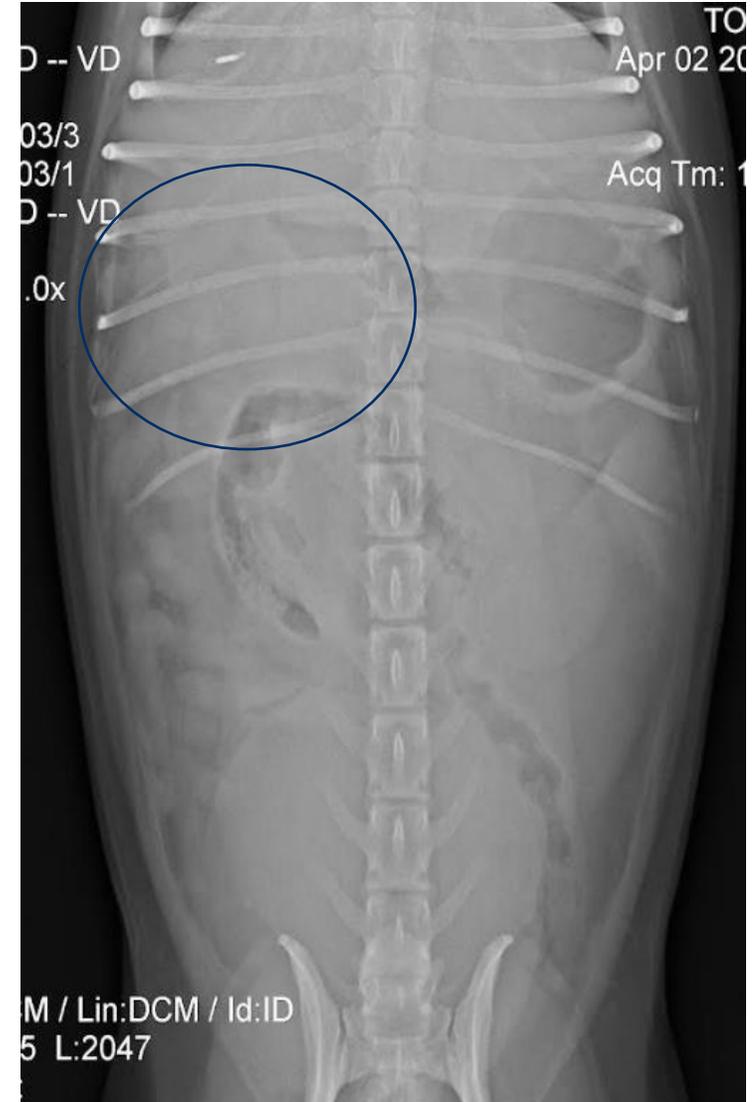
- + Casts
- + Proteinuria
- + Bilirubinuria

Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med.* 2021; 35(6):2572-2587. doi: 10.1111/jvim.16292.

Abdominal radiographs



- + Decreased serosal detail in the cranial abdomen
- + Focal mass effect between the pyloroduodenal angle and colon
- + Fluid or gas in the stomach and/or small intestinal due to ileus



Images courtesy of Dr. Melissa Herrera

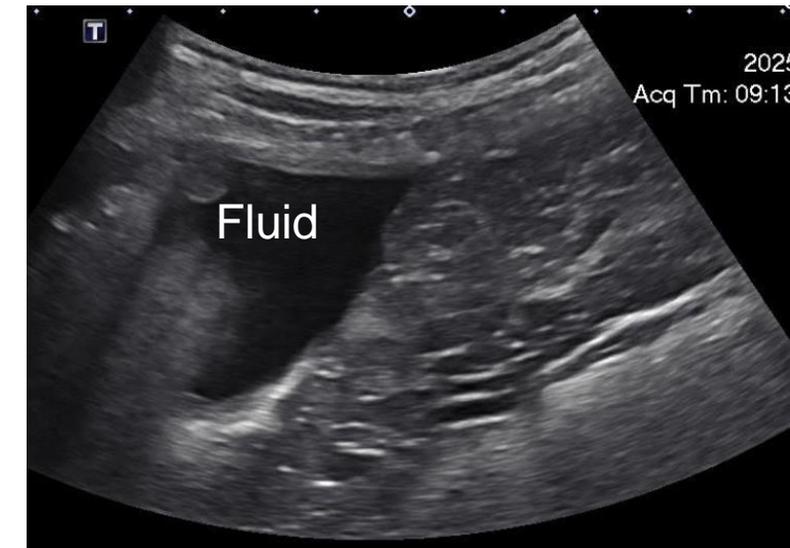
Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med.* 2021;35(6):2572-2587. doi: 10.1111/jvim.16292.

Abdominal ultrasound – acute pancreatitis

- + Enlarged pancreas
- + Hypoechoogenic parenchyma
- + Hyperechoogenic surrounding mesenteric fat
- + Peripancreatic fluid
- + Gall bladder distension, dilated common bile duct
- + Sensitivity/specificity varies
 - + Depends on criteria
 - + Operator dependent



Images courtesy of Dr. Melissa Herrera



Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med.* 2021; 35(6):2572-2587. doi: 10.1111/jvim.16292.

Cridge H, Sullivant AM, Wills RW, Lee AM. Association between abdominal ultrasound findings, the specific pancreatic lipase assay, clinical severity indices, and clinical diagnosis in dogs with pancreatitis. *J Vet Intern Med.* 2020; 34(20):636-643. doi: 10.1111/jvim.15693.

Abdominal ultrasound – chronic pancreatitis

- + Mixed hyperechoic and hypoechoic to a more uniform hypoechoic pattern
- + Mass lesions
- + Possible overlap with acute pancreatitis
- + No changes
- + Pancreas not identified
 - + Exocrine pancreatic insufficiency (EPI)
- + Sensitivity varies
 - + 56% in one paper



Image courtesy of Dr. Allison Cannon

Watson PJ, Archer J, Roulois AJ, Scase TJ, Herrtage ME. Observational study of 14 cases of chronic pancreatitis in dogs. *Vet Rec.* 2010;167: 968-976. doi: 10.1136/vr.c4912.

Serum biomarkers for pancreatitis



Lipase



Lipases: enzymes that are used to break down lipids



Sources:

Pancreatic	Hepatic
Lipoprotein	Renal
Endothelial	Gastrointestinal



There are several different diagnostic methods for measuring lipase

Lipase assays

+ Activity assays

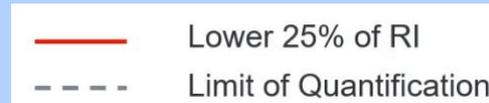
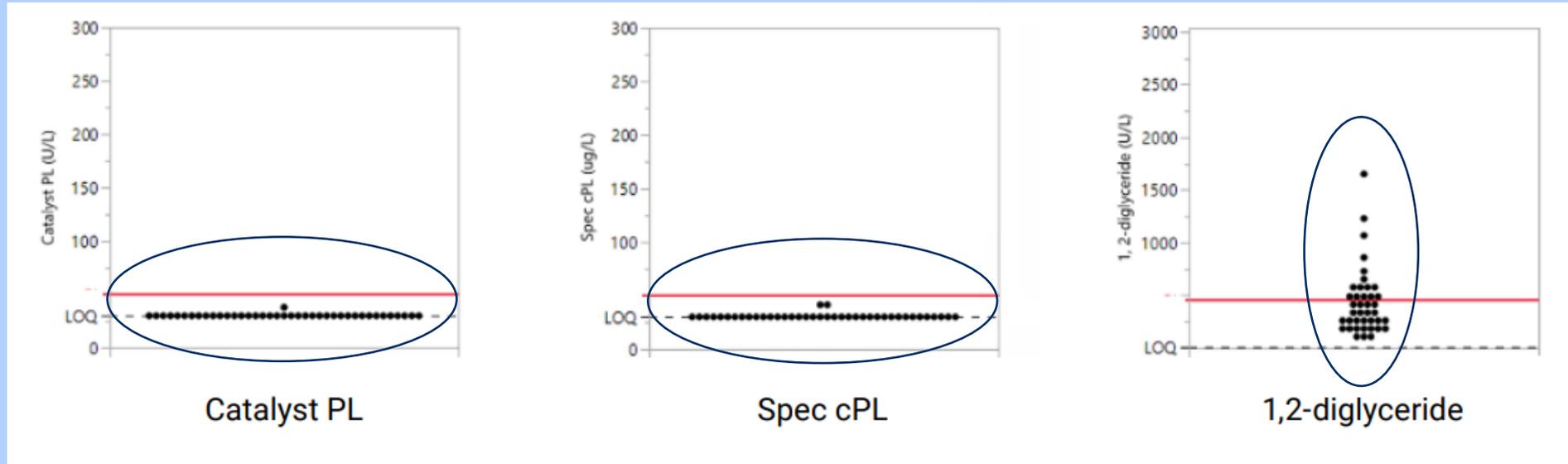
- + Lipase on Catalyst[®]
- + Lipase at IDEXX Reference Laboratories
- + Catalyst[®] Pancreatic Lipase

+ Immunoassays

- + Canine pancreatic lipase immunoreactivity (cPLI)
 - + Spec cPL[®] Test
 - + SNAP[®] cPL[™] Test

Chemistry				
ALP	132	23 - 212 U/L		
GGT	6	0 - 11 U/L		
Bilirubin - Total	0.4	0.0 - 0.9 mg/dL		
Cholesterol	281	110 - 320 mg/dL		
Amylase	1,046	500 - 1,500 U/L		
Lipase	3,023	200 - 1,800 U/L		
Osmolality	303	mmol/kg		
Catalyst Pancreatic Lipase	715	0 - 200 U/L		

Measurement of lipase in dogs with exocrine pancreatic insufficiency



Catalyst® Pancreatic Lipase Test: an in-house quantitative pancreatic lipase test for dogs and cats., 2024.
<https://www.idexx.com/files/catalyst-pancreatic-lipase-whitepaper-en.pdf>.

Lipase assays

+ Activity assays

- + Lipase on Catalyst[®]
- + Lipase at IDEXX Reference Laboratories
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Lipase assays

SNAP® cPL™

- + Canine specific assay
- + Good qualitative screening test to rule out pancreatitis
- + Higher sensitivity than specificity
- + **If abnormal recommend quantifying pancreatic lipase**

Spec cPL®

- + Canine specific assay
- + High specificity and sensitivity, especially for acute and severe disease
- + Less sensitive and specific for chronic disease

Catalyst® Pancreatic Lipase

- + Cats or dogs on one slide (DGGR based)
- + Same decision threshold as with Spec cPL®
- + Excellent correlation with Spec cPL®

Trivedi S, Marks SL, Kass PH, Luff JA, Keller SM, Johnson EG, Murphy B. Sensitivity and specificity of canine pancreas-specific lipase (cPL) and other markers for pancreatitis in 70 dogs with and without histopathologic evidence of pancreatitis. *J Vet Intern Med.* 2011; 25(6):1241-7. doi: 10.1111/j.1939-1676.2011.00793.x.

Lim SY, Steiner JM, Cridge H. Understanding lipase assays in the diagnosis of pancreatitis in veterinary medicine. *J Am Vet Med Assoc.* 2022;260(11):2572-2587. doi: 10.2460/javma.22.03.0144.

Amylase

- + Hydrolysis of complex carbohydrates
- + Secreted by various tissues (pancreas, intestines, liver)
- + Elevated amylase
 - + Pancreatitis
 - + Intestinal diseases/obstruction
 - + Reduced glomerular filtration rate (GFR)

Nonspecific for the detection of pancreatitis

Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med.* 2021; 35(6):2572-2587. doi: 10.1111/jvim.16292.

C-reactive protein (CRP)

- + Acute phase protein produced in the liver
- + Major acute phase protein in the dog
- + Concentrations in healthy dogs are low but marked increases occur rapidly in response to acute systemic inflammation
 - + Decrease rapidly with resolution of inflammation
 - + Monitoring serial changes over time can be helpful



“C-Reactive Protein.” eClinpath, July 30, 2025. <https://eclinpath.com/chemistry/proteins/acute-phase-proteins/c-reactive-protein/>.

Fine needle aspiration and biopsy

Fine needle aspiration

- + Acute pancreatitis
 - + Degenerate or nondegenerate neutrophils
 - + Degenerate pancreatic acinar cells or necrotic debris
- + Chronic pancreatitis
 - + Low cellularity
 - + Small numbers of lymphocytes or mixed inflammation
 - + Inflammation can be localized

Biopsy

- + Traditionally gold standard for diagnosis and to distinguish acute vs. chronic pancreatitis
- + Rarely performed
 - + Invasive
 - + Focal changes can be missed

Cridge H, Twedt DC, Marolf AJ, Sharkey LC, Steiner JM. Advances in the diagnosis of acute pancreatitis in dogs. *J Vet Intern Med.* 2021; 35(6):2572-2587. doi: 10.1111/jvim.16292.

Treatment



Treatment – inpatient

- + Identification and management of the cause if present
 - + Majority idiopathic
- + Fluid therapy – crystalloids
- + Plasma, synthetic colloids
 - + No evidence that use is beneficial unless specific indication

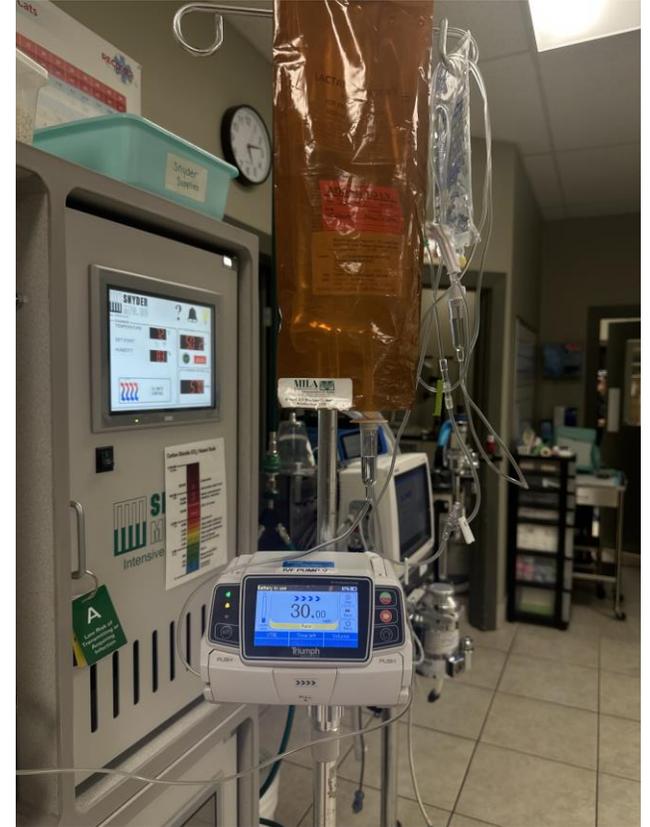


Photo courtesy of Dr. Allison Cannon

Lim SY, Cridge H, Twedt DC, Ohta H, Nuruki T, Steiner JM. Management of acute onset pancreatitis: A Narrative Review. *J Am Vet Med Assoc.* 2024;262(9):1231-1240. doi:10.2460/javma.24.02.0107.

Weatherton LK, Streeter EM. Evaluation of fresh frozen plasma administration in dogs with pancreatitis: 77 cases (1995-2005): retrospective study. *J Vet Emerg Crit Care.* 2009; 19(6): 617-622. doi: 10.1111/j.1476-4431.2009.00483.x.

Treatment – inpatient

+ Antiemetics and prokinetics

- + Maropitant
- + Ondansetron
- + Cisapride, metoclopramide, erythromycin
 - + If gastric stasis and/or gastroesophageal reflux or reflux esophagitis

+ Gastric acid suppression

- + Routine administration not recommended unless evidence of gastrointestinal bleeding or esophagitis
 - + Proton pump inhibitors (PPI)
 - + Histamine-2 receptor antagonists (H2 blockers)

+ Antibiotics

- + If infectious complications are present



Analgesia – inpatient

- + Signs of pain may not be obvious
 - + Prayer position
 - + Tachycardia, tachypnea, increased blood pressure
 - + Vague signs
 - + Restlessness, trembling, reluctance to move, vocalization
- + Opioids
 - + Fentanyl, methadone, others - full mu agonists
 - + Buprenorphine - partial mu agonist/kappa antagonist
- + Constant rate infusions
 - + Fentanyl, ketamine, lidocaine
- + NSAIDs - contraindicated
 - + Potential for GI and renal side effects



Nutrition – inpatient

- + Type of diet: low to moderate fat, highly digestible GI diet recommended during recovery
 - + Some nutritionists recommend decreasing dietary fat by 50% of previous diet
 - + Avoid excess soluble fiber – delayed gastric emptying
- + Enteral feeding tube indicated within 3 days (including before hospitalization)
 - + NE and NG tubes while hospitalized – can be placed under sedation
 - + Commercial low fat liquid diets available
 - + Start with 25% of resting energy requirements (RER)

- + Can try appetite stimulant
 - + Mirtazapine, capromorelin – may have minimal success
- + Contraindications to feeding
 - + Uncontrolled vomiting
 - + Abdominal pain associated with feeding



Lim SY, Cridge H, Twedt DC, Ohta H, Nuruki T, Steiner JM. Management of acute onset pancreatitis: A Narrative Review. *J Am Vet Med Assoc.* 2024; 262(9):1231-1240. doi:10.2460/javma.24.02.0107.

Cridge H, Parker VJ, Kathrani Aarti. Nutritional management of pancreatitis and concurrent disease in dogs and cats. *J Am Vet Med Assoc.* 2024;262(6):834-840. doi: 10.2460/javma.23.11.0641.

Other therapies – acute pancreatitis

+ Fuzapladib

- + Conditionally approved by the FDA for the management of clinical signs associated with acute onset of pancreatitis
- + Novel leukocyte function-associated antigen type-1 (LFA-1) activation inhibitor
- + Blocks activation and subsequent adhesion and migration of neutrophils
- + Potentially decreases the risk of pancreatitis progression and systemic inflammation
- + Study
 - + Patients randomly assigned, clinicians blinded

- + Safe to use
- + Mean change in modified clinical activity index significantly higher vs. placebo
- + Impact on survival and duration of hospitalization not investigated

Steiner JM, Lainesse C, Noshiro Y, Domen Y, Sedlacek H, Bienhoff SE, Doucette KP, Bledsoe DL, Shikama H. Fuzapladib in a randomized controlled multicenter masked study in dogs with presumptive acute onset pancreatitis *J Vet Intern Med.* 2023; 37(6):2084-2092. doi: 10.1111/jvim.16897.

Other therapies – acute pancreatitis

+ Steroids

- + Study investigated efficacy of prednisolone for the initial treatment of acute pancreatitis in dogs
 - + Compared prognosis with and without
 - + Dogs in earlier period received prednisolone subcutaneously
 - + Dogs in later period treated without prednisolone

- + Greater and earlier reductions in CRP
- + Earlier improvement in clinical score
- + Shorter duration of hospitalization
- + Higher survival rate after discharge
- + Further studies needed

Okanishi H, Nagata T, Nakane S, Watari T. Comparison of initial treatment with and without corticosteroids for suspected acute pancreatitis in dogs. *J Small Anim Pract.* 2019;60(5):298-304. doi: 10.1111/jsap.12994.

Complications

- + Extrahepatic bile duct obstruction
- + Gastric stasis/small intestinal ileus
- + Pneumonitis/pneumonia from aspiration
- + Transient hyperglycemia, diabetes mellitus, diabetic ketoacidosis
- + Severe systemic inflammation
 - + Systemic inflammatory response syndrome (SIRS)
 - + Multiple organ dysfunction syndrome (MODS)
- + Hypercoagulability/disseminated intravascular coagulation (DIC)



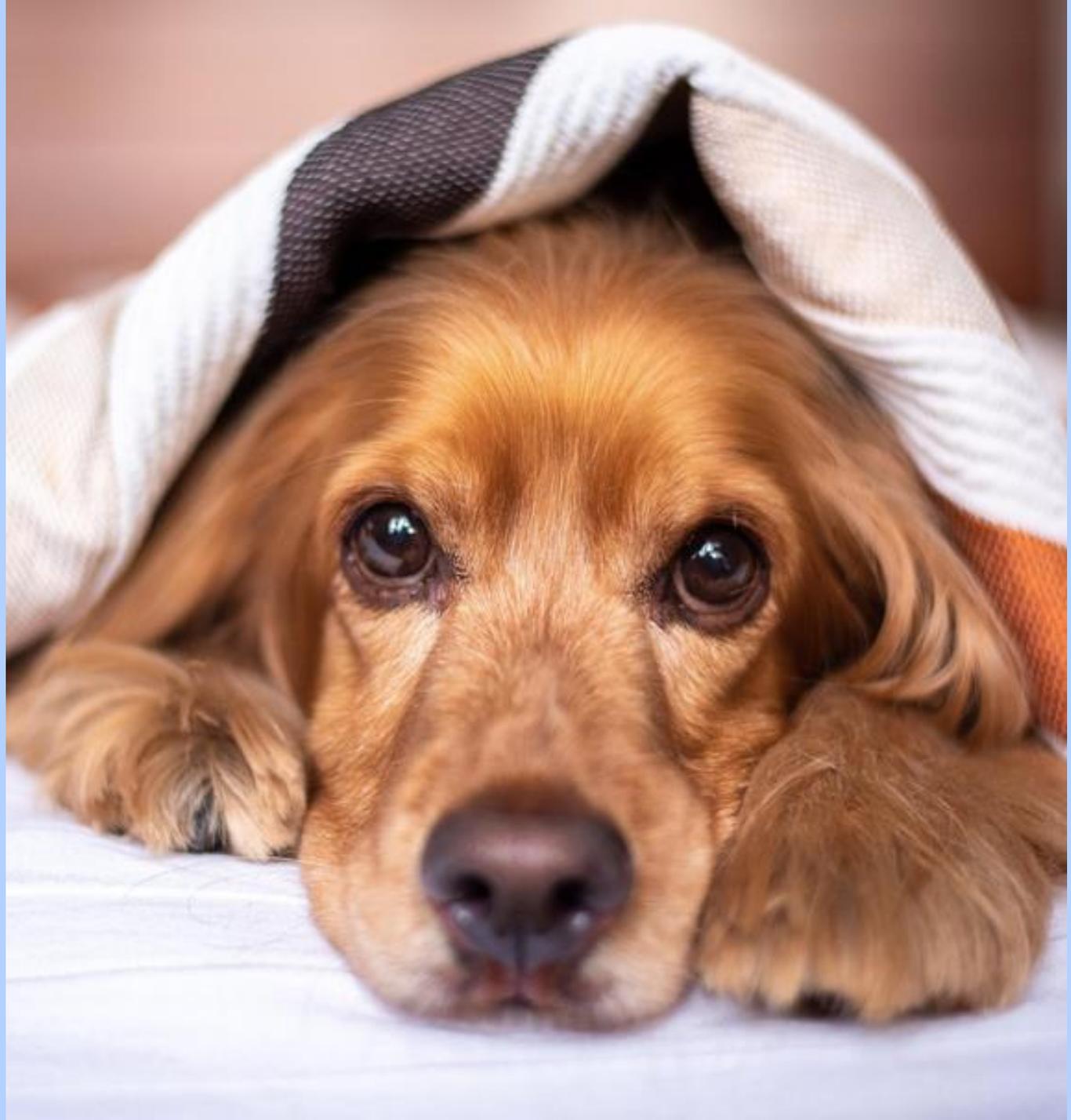
Treatment – outpatient

- + Symptomatic
 - + Antiemetics
 - + Pain management
 - + Low fat diet
 - + Management of comorbidities
 - + Diabetes mellitus
 - + Exocrine pancreatic insufficiency



Watson PJ, Archer J, Roulois AJ, Scase TJ, Herrtage ME. Observational study of 14 cases of chronic pancreatitis in dogs. *Vet Rec.* 2010;167: 968-976. doi: 10.1136/vr.c4912.

Monitoring



Monitoring – lipase, CRP, ultrasound

- + In dogs with PLI >400 µg/l lipase activity decreased to near or within RI within approximately 2 days of treatment
- + Significant differences in PLI and CRP between day 0 and day 7 and day 0 and day 28
- + The ultrasonographic score did not drop significantly during the early phases of the disease
 - + Suggests that ultrasonographic resolution of pancreatitis can lag behind resolution of clinical signs and immunologic pancreatic lipase assay results

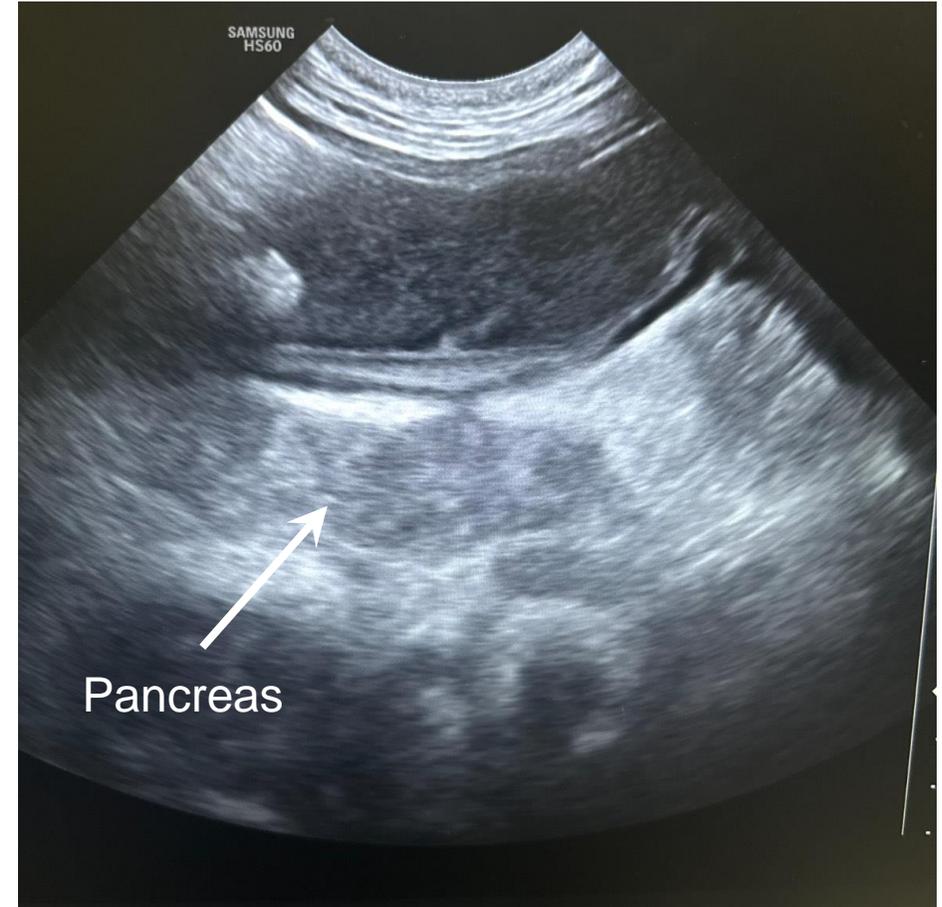
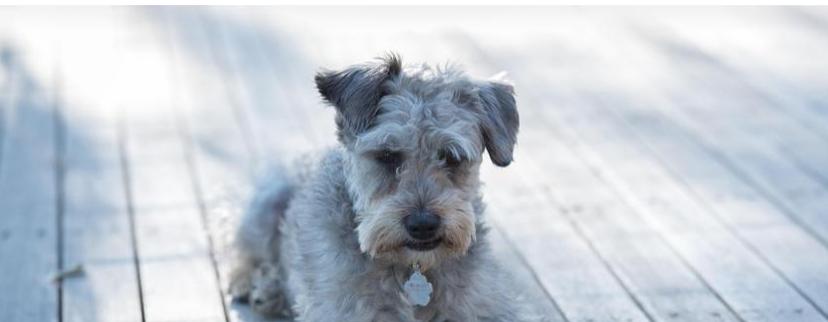


Image courtesy of Dr. Allison Cannon

Mitchell L, Wang S, Lawver J, et.al. Serial monitoring of pancreatic lipase immunoreactivity, C-reactive protein, abdominal ultrasonography, and clinical severity in dogs with suspected pancreatitis. *J Vet Intern Med.* 2024 Mar-Apr;38(2):987-994. doi: 10.1111/jvim.17020.



Benny



Mattie

Photo courtesy of Dr. Muki Laszlow

Signalment

+ 4-year-old, MN schnoodle

+ 15-year-old FS catahoula/boxer mix

History

- + Vomiting x 24 hours
- + Recent diarrhea
- + Very lethargic that evening after visit to urgent care

- + Osteoarthritis
- + Recent dental with extractions
- + Lethargy, vomited once, diarrhea
- + Still eating, but less
- + Owned by a veterinarian 😊

Physical examination

- + T: 100.5°F, P: 180, R: 72
- + +/- hydrated
- + Abdomen: tense and guarded on palpation

- + TPR: within normal limits
- + Hydrated
- + Oral cavity healing well
- + Quiet

Benny

- + Presented to the ER for acute vomiting x 24 hours. Last vomited the morning of presentation.
- + Has some diarrhea episodes recently
- + Went to urgent care the same day
 - + Very lethargic after visit
- + Past history: seizures
- + PE: tense abdomen, P 180, R 72
- + Plan:
 - + CBC, chemistry panel, SNAP cPL
 - + Abdominal radiographs
 - + Abdominal ultrasound in the morning



Benny – CBC

Hematology

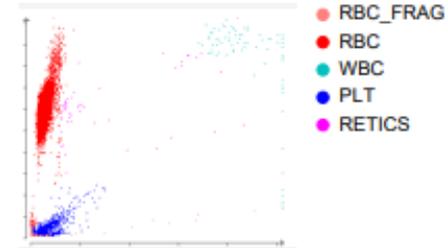


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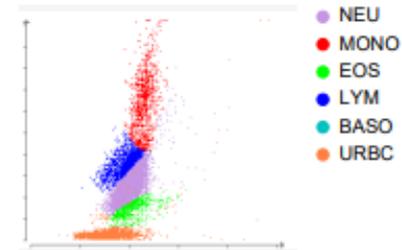
TEST	RESULT	REFERENCE VALUE	
RBC	6.74	5.65 - 8.87 M/ μ L	
Hematocrit	45.5	37.3 - 61.7 %	
Hemoglobin	21.6	13.1 - 20.5 g/dL	H
MCV	67.5	61.6 - 73.5 fL	
MCH	32.0	21.2 - 25.9 pg	H
MCHC	47.5	32.0 - 37.9 g/dL	H
RDW	17.5	13.6 - 21.7 %	
% Reticulocytes	0.2	%	
Reticulocytes	16.2	10.0 - 110.0 K/ μ L	
Reticulocyte Hemoglobin	24.0	22.3 - 29.6 pg	
WBC	* 15.84	5.05 - 16.76 K/ μ L	
% Neutrophils	* 65.8	%	
% Lymphocytes	* 19.1	%	
% Monocytes	* 8.6	%	
% Eosinophils	* 6.5	%	
% Basophils	* 0.0	%	
Neutrophils	* 10.43	2.95 - 11.64 K/ μ L	
Bands	* Suspected		
Lymphocytes	* 3.02	1.05 - 5.10 K/ μ L	
Monocytes	* 1.36	0.16 - 1.12 K/μL	H
Eosinophils	* 1.03	0.06 - 1.23 K/ μ L	
Basophils	* 0.00	0.00 - 0.10 K/ μ L	
Platelets	* 437	148 - 484 K/ μ L	
PDW	- ---	9.1 - 19.4 fL	
MPV	* 11.0	8.7 - 13.2 fL	

RBC Run



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WBC Run



[Download](#)

PLT Aggregates Detected

* Confirm with dot plot and/or blood film review.

Immature and/or toxic neutrophils likely present - Consider inflammation.

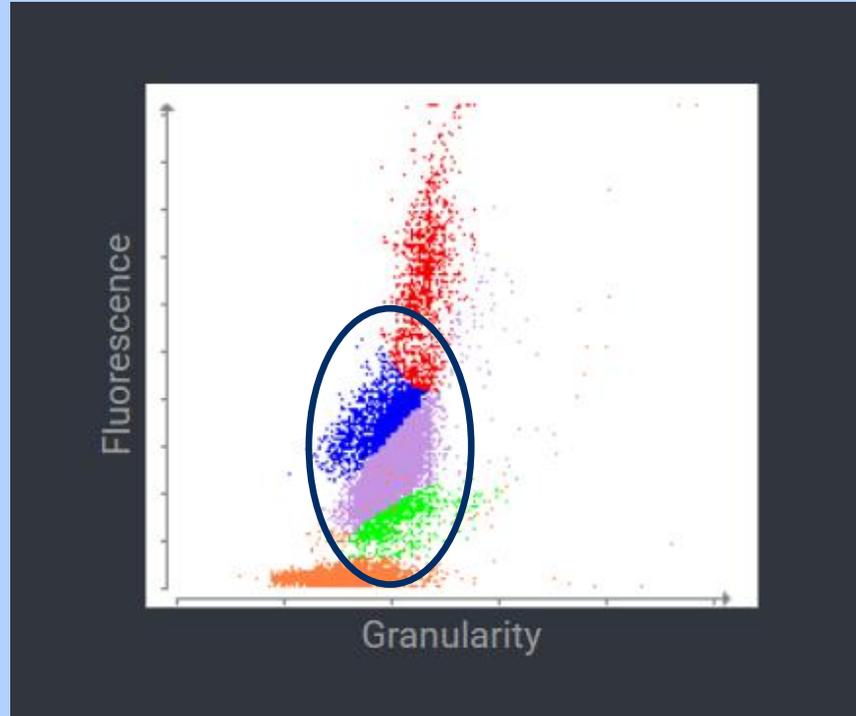
Platelet aggregates are detected. Platelet count may be higher than reported.

Increased MCHC or MCH - Consider hemolysis (including sample collection/handling), lipemia, and Heinz bodies.

Benny – white blood cell dot plot

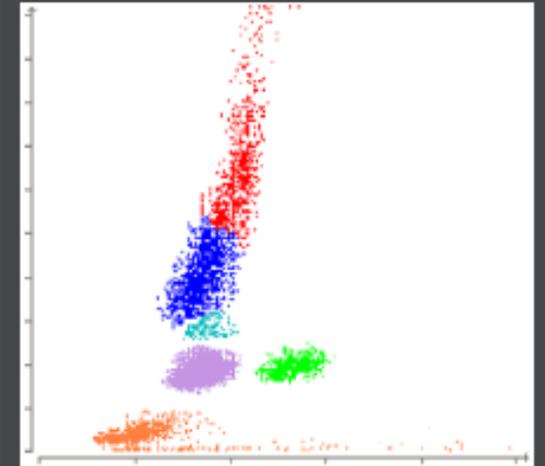
■ 🦋 Neutrophils	*10.43	2.95 - 11.64 K/ μ L
■ 🦋 Bands	*Suspected	
■ 🦋 Lymphocytes	*3.02	1.05 - 5.10 K/ μ L
■ 🦋 Monocytes	*1.36	0.16 - 1.12 K/ μ L
■ 🦋 Eosinophils	*1.03	0.06 - 1.23 K/ μ L
■ 🦋 Basophils	*0.00	0.00 - 0.10 K/ μ L

Benny

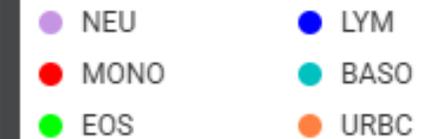


Normal

Normal WBC Run (Canine)



Dot plot legend

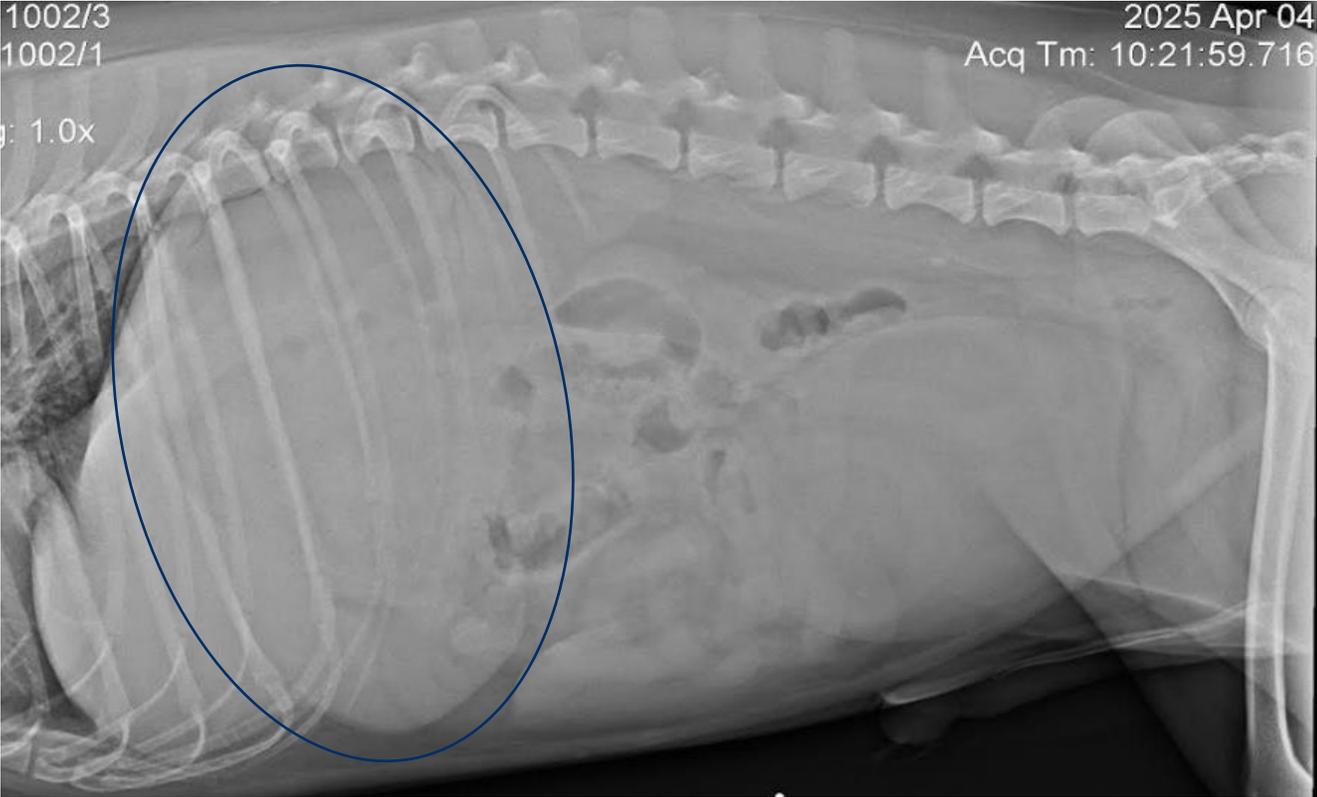


Benny – chemistry panel

Chemistry		4/2/25 8:11 PM	4/2/25 7:43 PM	
Glucose	110	74 - 143 mg/dL		
Creatinine	0.7	0.5 - 1.8 mg/dL		
BUN	9	7 - 27 mg/dL		
BUN: Creatinine Ratio	12			
Phosphorus	4.0	2.5 - 6.8 mg/dL		
Calcium	9.1	7.9 - 12.0 mg/dL		
Sodium	144	144 - 160 mmol/L		
Potassium	3.4	3.5 - 5.8 mmol/L		
Na: K Ratio	42			
Chloride	107	109 - 122 mmol/L		
Total Protein	8.3	5.2 - 8.2 g/dL		
Albumin	3.5	2.3 - 4.0 g/dL		
Globulin	4.8	2.5 - 4.5 g/dL		
Albumin: Globulin Ratio	0.7			

ALT	183	10 - 125 U/L		
ALP	196	23 - 212 U/L		
GGT	3	0 - 11 U/L		
Bilirubin - Total	0.7	0.0 - 0.9 mg/dL		
Cholesterol	341	110 - 320 mg/dL		
Amylase	2,324	500 - 1,500 U/L		
Lipase	1,662	200 - 1,800 U/L		
Osmolality	284	mmol/kg		
SNAP cPL	Abnormal			

Benny – radiographs



Images courtesy of Dr. Meilssa Herrera

Benny – ultrasound

- + Pancreas
 - + Markedly enlarged and hypoechoic with surrounding hyperechoic mesentery
- + Small volume of abdominal effusion
- + Moderate to marked fluid-distended stomach
- + Mild dilation of duodenum



Images courtesy of Dr. Melissa Herrera

Benny – treatment

- + Fluids
 - + IV LRS
- + Gastric acid inhibition:
 - + Pantoprazole
- + Prokinetic
 - + Metoclopramide CRI
- + Anti-emetic
 - + Ondansetron
- + Phenobarbital to IV until able to take PO
- + Analgesia:
 - + Methadone initially, later buprenorphine IV
- + Fuzapladib on days 2-4



Benny – the adventure continues...

- + Discharged on day 5
 - + Turkey and rice and a commercial low fat diet
 - + Cisapride, omeprazole and sucralfate
 - + Maropitant as needed
 - + Probiotic for soft stools
 - + Phenobarbital
- + Recheck blood work
 - + Elevated ALP
- + Not back to normal but doing ok
- + Two days later stopped eating
 - + On recheck exam, his mucous membranes were icteric

Chemistry

	4/12/25 5:06 AM	4/2/25 8:11 PM
ALT	119	183
AST		
ALP	809	196
GGT		3
Bilirubin - Total	0.2	0.7
Bilirubin - Unconjugated		
Bilirubin - Conjugated		
Cholesterol		341

Benny – the adventure continues...

Ultrasound

- + Severely hypoechoic and enlarged R pancreatic limb, cystic structure in L limb
- + Focal thickening of gastric wall
- + Gallbladder distension
 - + Common bile duct not obviously distended

Treatment

- + Hospitalized for 5 more days, received previous treatments and added:
 - + Antibiotics, steroid

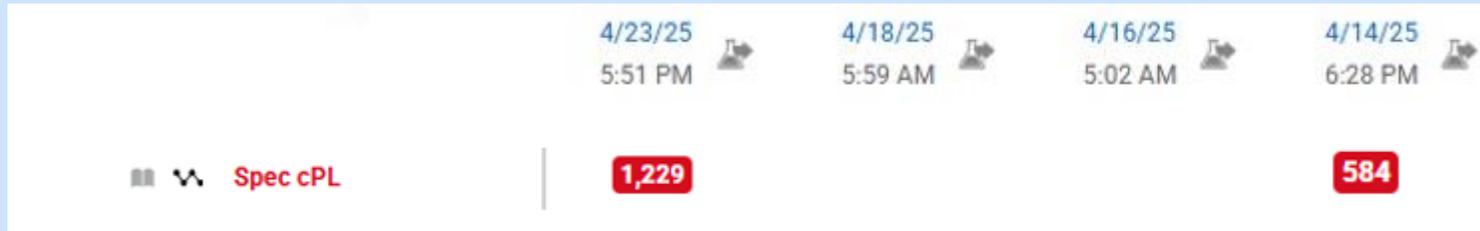
Discharge medications

- + Prednisone, enrofloxacin, cisapride, omeprazole, sucralfate, maropitant mirtazapine, ursodiol, SAM-E/silybin, phenobarbital

Chemistry

	4/23/25 5:51 PM	4/18/25 5:59 AM	4/16/25 5:02 AM	4/14/25 6:28 PM	4/12/25 5:06 AM
ALT	217	758	1,112	1,497	119
AST	18	38	106	108	
ALP	1,188	2,932	4,450	3,159	809
GGT	36	58	73	37	
Bilirubin - Total	0.3	0.8	3.5	6.4	0.2
Bilirubin - Unconjugated	0.2	0.4	1.2	1.7	
Bilirubin - Conjugated	0.1	0.4	2.3	4.7	
Cholesterol	700	732	825	712	
Spec cPL		1,229		584	

Benny – pancreatic lipase



- + **≤ 200 µg/L:** Normal reference interval
- + **201–399 µg/L:** Pancreatic lipase concentration is in the equivocal range, and pancreatitis is possible. Investigate for other diseases and consider additional diagnostics and/or treatment if clinical signs or other evidence of disease exist. Recheck with the test in 2–3 weeks.
- + **≥ 400 µg/L:** **Pancreatic lipase concentration is consistent with pancreatitis.** If clinical signs are present, treat appropriately and investigate for risk factors and concurrent diseases, including gastroenteritis or foreign body. Monitor to assess response to treatment. If clinical signs are not present, consider additional diagnostics, instruct owner to monitor closely, and recheck the test in 2–3 weeks.

Mattie

- + Signalment
 - + 15-year-old, female spayed catahoula/boxer mix
- + Reason for consult
 - + Pre-dental blood work assessment
 - + Owner is a vet 😊
- + Previous history
 - + Osteoarthritis
- + Current medications
 - + Flea/tick and heartworm preventive
 - + Bedinvetmab
- + Physical exam
 - + Bilateral premolar fractures upper arcade with abscess formation
 - + Remainder of exam unremarkable



Photo courtesy of Dr. Muki Laszlo

Hematology



5/4/24 (Order Received)
5/4/24 4:56 AM (Last Updated)

TEST	RESULT	REFERENCE VALUE	
RBC	6.43	5.39 - 8.70 M/ μ L	
Hematocrit	44.3	38.3 - 56.5 %	
Hemoglobin	16.2	13.4 - 20.7 g/dL	
MCV	69	59 - 76 fL	
MCH	25.2	21.9 - 26.1 pg	
MCHC	36.6	32.6 - 39.2 g/dL	
% Reticulocytes	0.9	%	
Reticulocytes	58	10 - 110 K/ μ L	
Reticulocyte Hemoglobin	26.5	24.5 - 31.8 pg	
WBC	9.8	4.9 - 17.6 K/ μ L	
% Neutrophils	61.3	%	
% Lymphocytes	14.7	%	
% Monocytes	4.7	%	
% Eosinophils	19.3	%	
% Basophils	0.0	%	
Neutrophils	6.007	2.94 - 12.67 K/ μ L	
Lymphocytes	1.441	1.06 - 4.95 K/ μ L	
Monocytes	0.461	0.13 - 1.15 K/ μ L	
Eosinophils	1.891	0.07 - 1.49 K/μL	H
Basophils	^a 0	0 - 0.1 K/ μ L	
Platelets	462	143 - 448 K/μL	H

Chemistry



5/4/24 (Order Received)
5/4/24 4:56 AM (Last Updated)

TEST	RESULT	REFERENCE VALUE	
Glucose	^e 109	63 - 114 mg/dL	
IDEXX SDMA	^a 7	0 - 14 μ g/dL	
Creatinine	0.8	0.5 - 1.5 mg/dL	
BUN	20	9 - 31 mg/dL	
BUN: Creatinine Ratio	25.0		
Phosphorus	4.3	2.5 - 6.1 mg/dL	
Calcium	10.0	8.4 - 11.8 mg/dL	
Sodium	146	142 - 152 mmol/L	
Potassium	4.8	4.0 - 5.4 mmol/L	
Na: K Ratio	30	28 - 37	
Chloride	110	108 - 119 mmol/L	
TCO2 (Bicarbonate)	20	13 - 27 mmol/L	
Anion Gap	21	11 - 26 mmol/L	
Total Protein	6.7	5.5 - 7.5 g/dL	
Albumin	3.1	2.7 - 3.9 g/dL	
Globulin	3.6	2.4 - 4.0 g/dL	
Albumin: Globulin Ratio	0.9	0.7 - 1.5	
ALT	217	18 - 121 U/L	H
AST	27	16 - 55 U/L	
ALP	154	5 - 160 U/L	
GGT	5	0 - 13 U/L	
Bilirubin - Total	0.1	0.0 - 0.3 mg/dL	
Bilirubin - Unconjugated	0.0	0.0 - 0.2 mg/dL	
Bilirubin - Conjugated	0.1	0.0 - 0.1 mg/dL	
Cholesterol	600	131 - 345 mg/dL	H
Amylase	746	337 - 1,469 U/L	
Lipase	1,342	0 - 250 U/L	H
Creatine Kinase	77	10 - 200 U/L	

Urinalysis



5/3/24

4:03 PM

4:01 PM

TEST RESULT REFERENCE VALUE

Note:

Collection Free Catch

Color Pale Yellow

Clarity Clear

Specific Gravity 1.019

pH 6.0

Urine Protein TR

Glucose neg

Ketones neg

Blood / Hemoglobin 50 Ery/ μ L

Bilirubin neg

Urobilinogen norm

Leukocyte Esterase neg

White Blood Cells <1 /HPF

Red Blood Cells 2 /HPF

Bacteria

Bacteria, Cocci None detected

Bacteria, Rods None detected

TEST RESULT RE

Epithelial Cells

Squamous Epithelial Cells None detected

Non-Squamous Epithelial Cells <1 /HPF

Mucus

Casts

Hyaline Casts Suspect presence

Non-Hyaline Casts None detected

Crystals

Calcium Oxalate Dihydrate Crystals None detected

Struvite Crystals None detected

Ammonium Biurate Crystals None detected

Bilirubin Crystals None detected

Unclassified Crystals None detected

Mattie – 3 days post-dental

May 28

- + Dental performed
 - + Several extractions
 - + Stable under anesthesia
 - + Uneventful recovery
- + Discharged that evening
 - + Eating well
 - + Tired/quiet
 - + Grapiprant, gabapentin, and tramadol

May 31

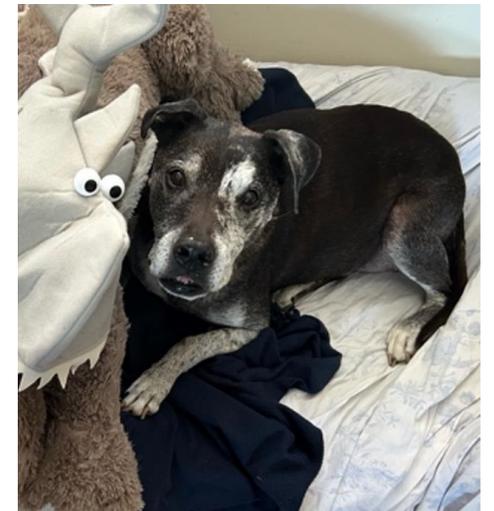
- + Acting “off” at home, lethargic
- + Few episodes of small bowel diarrhea
- + Vomited once
- + Still eating but less and getting worse

Physical exam

- + TPR: within normal limits
- + BCS: 5/9
- + Hydrated, quiet
- + Oral cavity healing well
- + Remainder of exam unremarkable

Plan

- + Hospitalize
- + Diagnostics
 - + CBC
 - + Chemistry panel
 - + Urinalysis



Hematology



5/31/24

5:17 PM

TEST	RESULT	REFERENCE VALUE	
RBC	6.75	5.65 - 8.87 M/ μ L	
Hematocrit	46.2	37.3 - 61.7 %	
Hemoglobin	15.5	13.1 - 20.5 g/dL	
MCV	68.4	61.6 - 73.5 fL	
MCH	23.0	21.2 - 25.9 pg	
MCHC	33.5	32.0 - 37.9 g/dL	
RDW	16.6	13.6 - 21.7 %	
% Reticulocytes	0.2	%	
Reticulocytes	14.9	10.0 - 110.0 K/ μ L	
Reticulocyte Hemoglobin	25.0	22.3 - 29.6 pg	
WBC	10.93	5.05 - 16.76 K/ μ L	
% Neutrophils	70.3	%	
% Lymphocytes	11.3	%	
% Monocytes	7.6	%	
% Eosinophils	10.6	%	
% Basophils	0.2	%	
Neutrophils	7.68	2.95 - 11.64 K/ μ L	
Lymphocytes	1.24	1.05 - 5.10 K/ μ L	
Monocytes	0.83	0.16 - 1.12 K/ μ L	
Eosinophils	1.16	0.06 - 1.23 K/ μ L	
Basophils	0.02	0.00 - 0.10 K/ μ L	
Platelets	529	148 - 484 K/ μ L	H
PDW	11.1	9.1 - 19.4 fL	
MPV	10.2	8.7 - 13.2 fL	
Plateletcrit	0.54	0.14 - 0.46 %	H

Chemistry

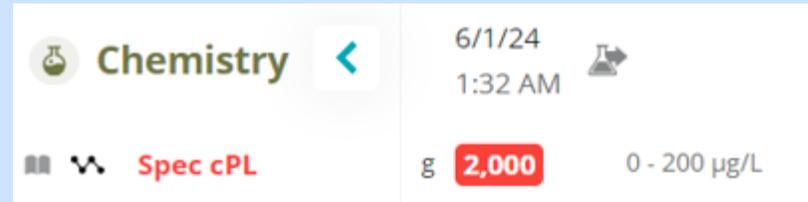


5/31/24

5:37 PM

TEST	RESULT	REFERENCE VALUE	
Glucose	107	70 - 143 mg/dL	
IDEXX SDMA ^c	14	0 - 14 μ g/dL	
Creatinine	1.2	0.5 - 1.8 mg/dL	
BUN	25	7 - 27 mg/dL	
BUN: Creatinine Ratio	21		
Phosphorus	5.3	2.5 - 6.8 mg/dL	
Calcium	10.6	7.9 - 12.0 mg/dL	
Sodium	150	144 - 160 mmol/L	
Potassium	6.0	3.5 - 5.8 mmol/L	H
Na: K Ratio	25		
Chloride	110	109 - 122 mmol/L	
Total Protein	7.2	5.2 - 8.2 g/dL	
Albumin	3.1	2.2 - 3.9 g/dL	
Globulin	4.1	2.5 - 4.5 g/dL	
Albumin: Globulin Ratio	0.8		
ALT	320	10 - 125 U/L	H
ALP	181	23 - 212 U/L	
GGT	7	0 - 11 U/L	
Bilirubin - Total	0.5	0.0 - 0.9 mg/dL	
Cholesterol	491	110 - 320 mg/dL	H
Amylase	1,667	500 - 1,500 U/L	H
Lipase	5,822	200 - 1,800 U/L	H
Osmolality	305	mmol/kg	

Mattie – pancreatic lipase



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Mattie – treatment

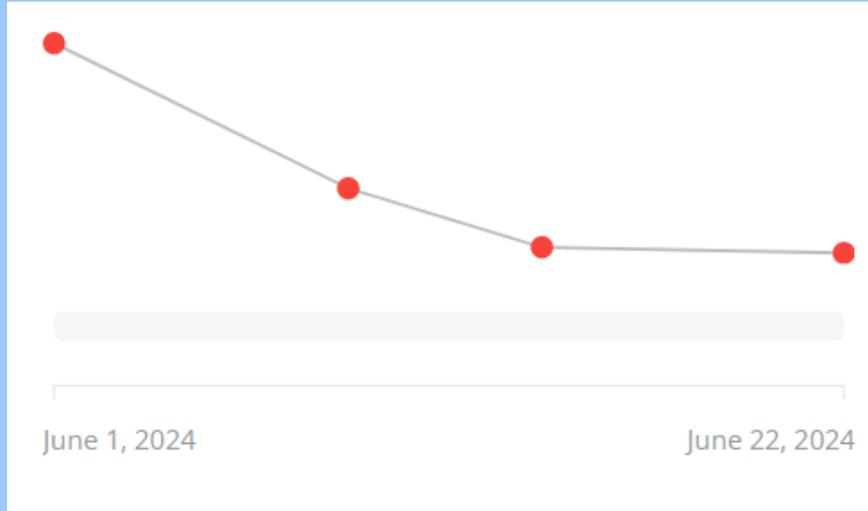
Plan

- + IV fluids
- + Discontinued grapiprant
- + Low-fat diet
- + Mattie improved significantly over the next day
 - + Weaned off IV fluids

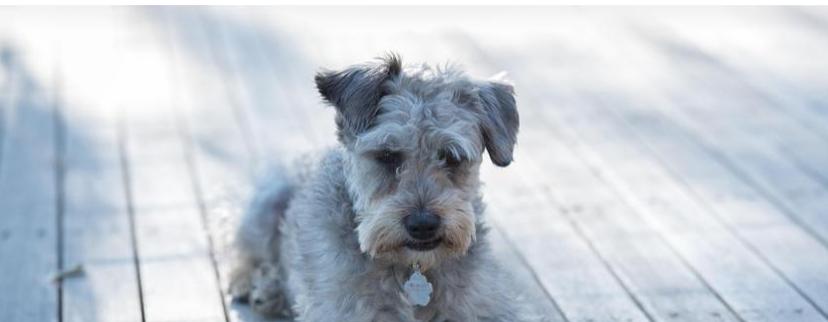


Photo courtesy of Dr. Muki Laszlo

Mattie – monitoring



 Chemistry	6/22/24 12:47 AM 	6/14/24 12:21 AM 	6/8/24 8:59 PM 	6/1/24 1:32 AM 
 Spec cPL	d 592	d 631	d 1,026	g 2,000



Benny



Mattie

Photo courtesy of Dr. Muki Laszlow

Signalment

+ 4-year-old, MN schnoodle

+ 15-year-old FS catahoula/boxer mix

History

- + Vomiting x 24 hours
- + Recent diarrhea
- + Very lethargic that evening after visit to urgent care

- + Osteoarthritis
- + Recent dental with extractions
- + Lethargy, vomited once, diarrhea
- + Still eating, but less
- + Owned by a veterinarian 😊

Physical examination

- + T: 100.5°F, P: 180, R: 72
- + +/- hydrated
- + Abdomen: tense and guarded on palpation

- + TPR: within normal limits
- + Hydrated
- + Oral cavity healing well
- + Quiet

Key takeaways



- + Diagnosis of pancreatitis is based on the clinical picture, laboratory results, serum biomarkers and imaging
- + Management is supportive
 - + Fluid therapy, early nutrition, antiemetics, prokinetics, analgesia, +/- ancillary therapies
- + Acute pancreatitis can resolve or become chronic
- + Chronic pancreatitis may be underrecognized
 - + Can have acute flare ups

Questions?



IDEXX