



Canine acute pancreatitis: Diagnosis and management

Fabio Procoli

DVM, MVetMed, DACVIM, DECVIM-CA, MRCVS



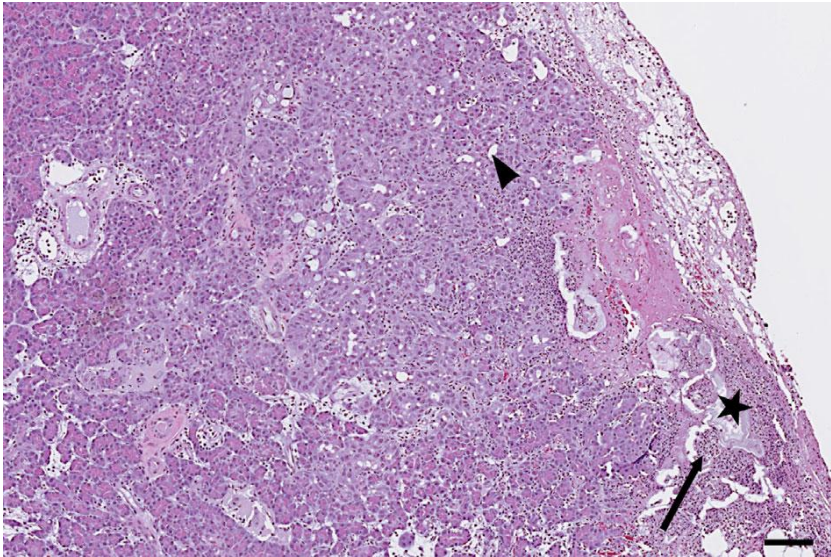
Definitions

Acute pancreatitis (AP)

Sterile suppurative
inflammation

Necrosis

Reversible



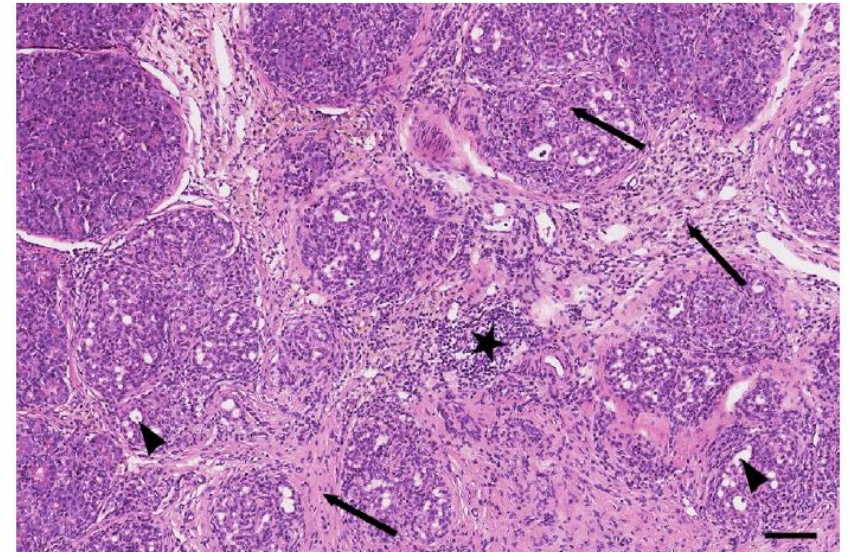
Chronic pancreatitis (CP)

Lymphoplasmacellular
inflammation

Fibrosis

Parenchymal atrophy

Irreversible



Prevalence unknown

AP historically more common than CP

Newman et al, 2004

73 pancreata from dogs deceased for many reasons

60% had evidence of pancreatitis

51% suppurative inflammation

49% necrosis

72% lymphocytic inflammation

60% fibrosis

Alternative classification

Based on duration/onset and severity of clinical signs

Pancreatic lipase increase

Severity

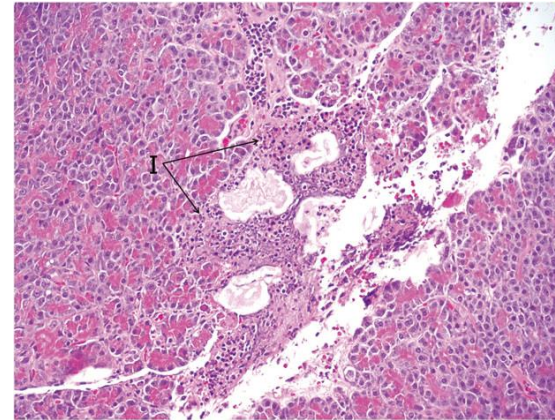
Duration

Diagnostic imaging

Clinical implications

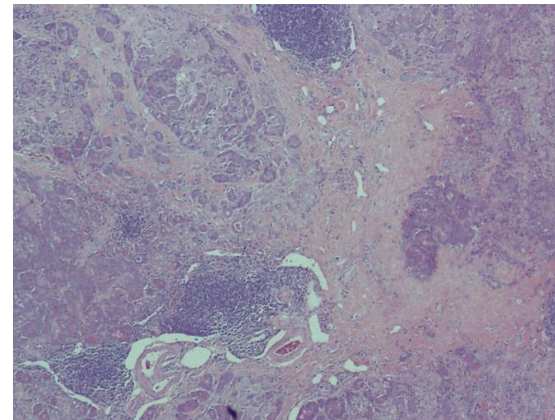
AP more severe – higher morbidity

Higher risk of local and systemic complications – higher mortality



CP subtle – lower morbidity

Less common systemic complications – rare mortality



Pathophysiology

Premature and inappropriate activation of pancreatic enzymes within acinar cells resulting in self-digestion

Apical block

Co-localization of lysosomal proteases and zymogens

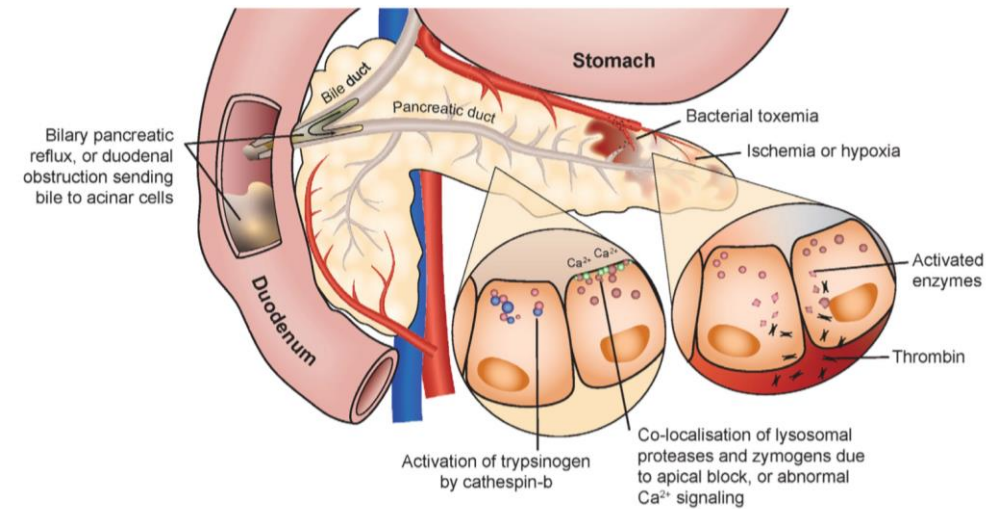
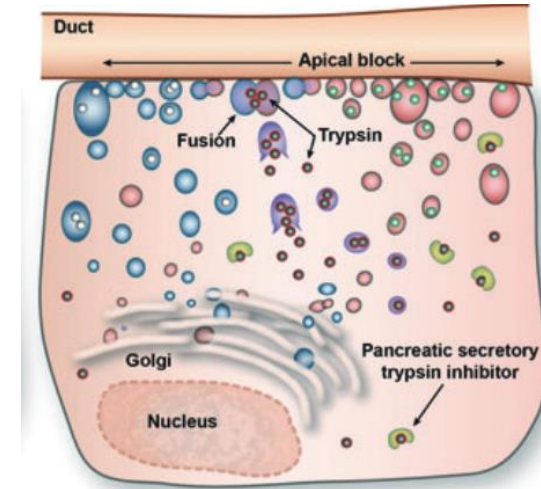
Ischemia/hypotension

Oxidative stress

Intra-acinar pH alteration

Intracellular Ca^{2+} release

Biliary/pancreatic reflux



Necrosis and death of acinar cells

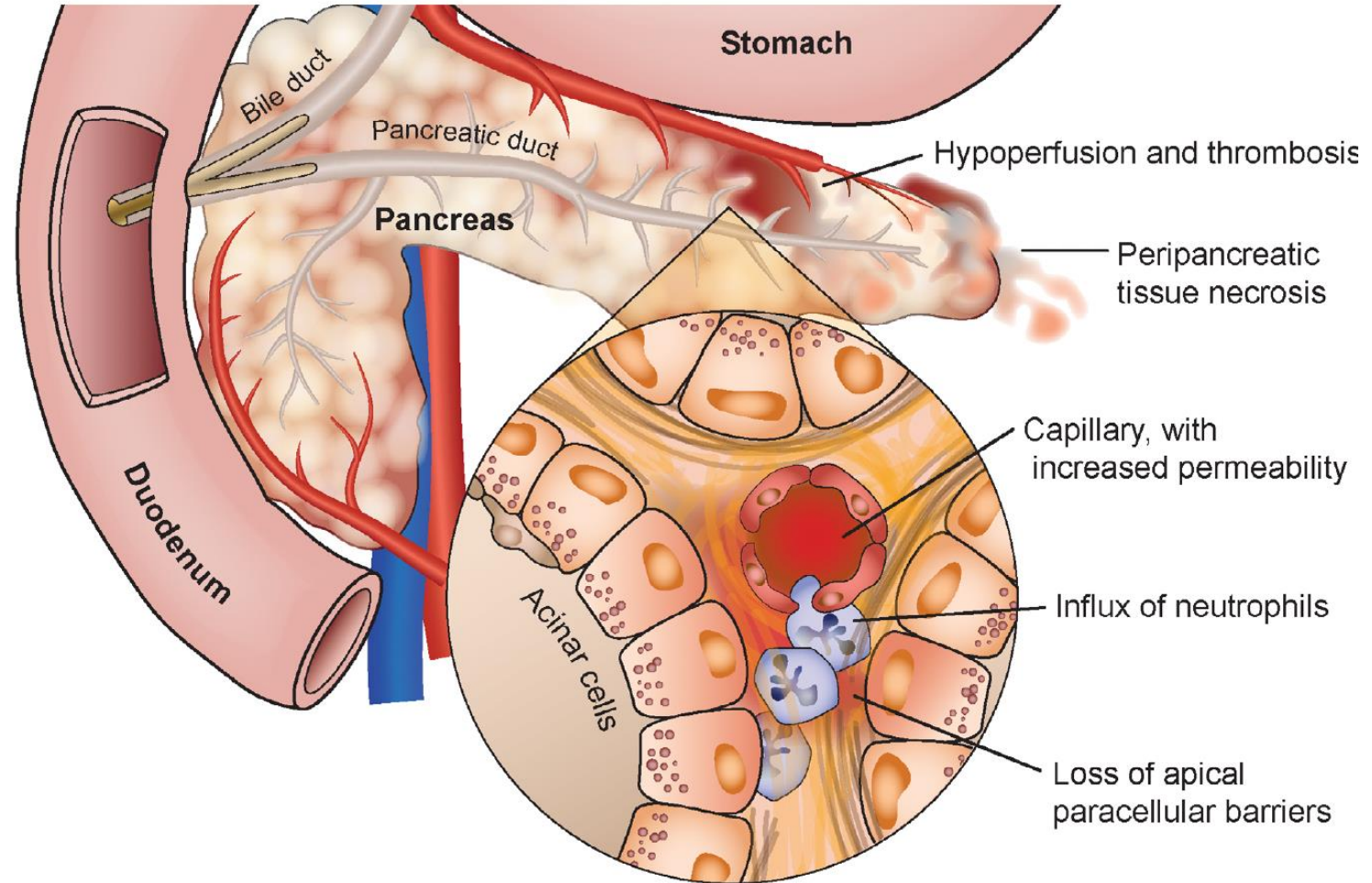
Release of inflammatory mediators and chemotaxis

Influx of PLMNs

Increased capillary permeability

Paracellular barrier loss

Extension of the inflammatory process



Forman MA, Steiner JM, Armstrong PJ, et al. *JVIM*. 2021; 35: 703–723.

Complications

Local

Steatitis/peritonitis/duodenitis

Extrahepatic biliary obstruction (EHBO)

Formation of abscess or cysts or pseudocysts

Systemic

SIRS, AKI, ALI, CID MODS

Multicenter Study > J Vet Emerg Crit Care (San Antonio). 2019 May;29(3):264-268.
doi: 10.1111/vec.12840. Epub 2019 Apr 29.

Multicenter investigation of hemostatic dysfunction in 15 dogs with acute pancreatitis

Lindsey Nielsen¹, Jennifer Holm¹, Elizabeth Rozanski², Dawn Meola², Lori Lyn Price^{3,4}, Armelle de Laforcade²

RESEARCH ARTICLE

Open Access

Pulmonary complications in dogs with acute presentation of pancreatitis



Eleonora Gori, Alessio Pierini[✉], Gianila Ceccherini, Simonetta Citi, Tommaso Mannucci, Ilaria Lippi and Veronica Marchetti

Acute pancreatitis and acute kidney injury in dogs

E. Gori, I. Lippi, G. Guidi, F. Perondi, A. Pierini  , V. Marchetti

Cardiovascular abnormalities in dogs with acute pancreatitis

Harry Cridge¹  | Daniel K. Langlois¹  | Jörg M. Steiner²  | Robert A. Sanders¹ 

From acute-to-chronic

Chronic low-grade inflammation

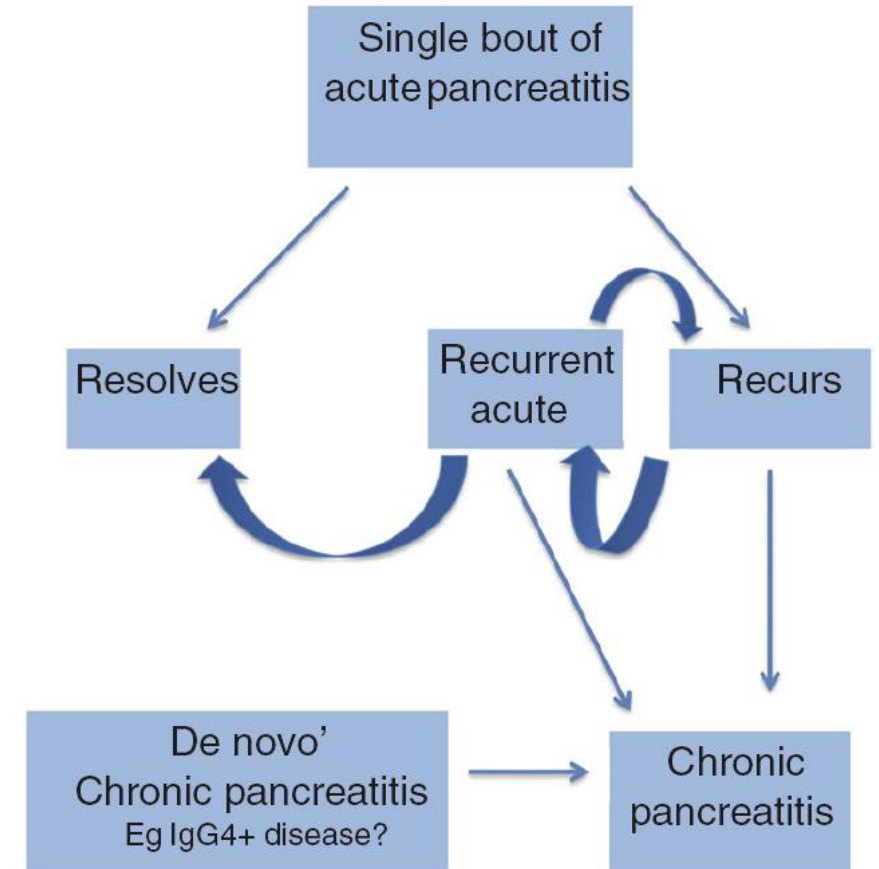
Stellate cell activation (PSC)

Fibrosis

Complications

Diabetes mellitus

EPI



Chronic pancreatitis in dogs: A retrospective study of clinical, clinicopathological, and histopathological findings in 61 cases

Brier M. Bostrom^{a,1}, Panagiotis G. Xenoulis^a, Shelley J. Newman^b, Roy R. Pool^c, Geoffrey T. Fosgate^d, Jörg M. Steiner^{a,*}

Ante-mortem diagnosis

Multimodal

Signalment

Medical history

Clinical and generic
laboratory findings

Pancreatic lipases

Diagnostic imaging

Cytology

Histology?



Breed-associated risk



> [J Vet Intern Med.](#) Jul-Aug 2011;25(4):797-804. doi: 10.1111/j.1939-1676.2011.0744.x.
Epub 2011 Jun 20.

Characterization of chronic pancreatitis in English Cocker Spaniels

P J Watson ¹, A Roulois, T Scase, A Holloway, M E Herrtage



Hyperlipidaemia

Genetic predisposition

Oxidative damage

Hyperviscosity and ischaemia



J Vet Intern Med 2011;25:20-23

Serum Triglyceride Concentrations in Miniature Schnauzers with and without a History of Probable Pancreatitis

P.G. Xenoulis, M.D. Levinski, J.S. Suchodolski, and J.M. Steiner

Dietary indiscretion

Relative risk (odds ratio, OR)

Ingestion of table scraps - OR 2.2x

Unusual food ingestion - OR 6.1x

Garbage ingestion - OR 13.1x



Associations between dietary factors and pancreatitis in dogs

Kristina Y. Lem, DVM, MS; Geoffrey T. Fosgate, DVM, PhD, DACVPM;
Bo Norby, C Med Vet, MPVM, PhD; Jörg M. Steiner, med vet, Dr med vet, PhD, DACVIM

Clinical presentation



AP

Vomiting 90%

Weakness 79%

Abdominal pain 58%

Dehydration 46%

Diarrhoea 33%

Fever 32%

Jaundice 26%

Haematemesis 10%

Mild forms /early stage

Subtle

Nausea

Hyporexia

Weight loss

Clinical, clinicopathologic, radiographic, and ultrasonographic abnormalities in dogs with fatal acute pancreatitis: 70 cases (1986–1995)

Rebecka S. Hess, DVM; H. Mark Saunders, VMD, MS; Thomas J. Van Winkle, VMD;
Frances S. Shofer, PhD; Robert J. Washabau, VMD, PhD



Chronic pancreatitis in dogs: A retrospective study of clinical, clinicopathological, and histopathological findings in 61 cases

Brier M. Bostrom^{a,1}, Panagiotis G. Xenoulis^a, Shelley J. Newman^b, Roy R. Pool^c, Geoffrey T. Fosgate^d, Jörg M. Steiner^{a,*}

Clinica Veterinaria
Valdinievole

Clinical pathology

CBC

Neutrophilia +/- left shift – rarely neutropenia

Thrombocytopenia

Anaemia – mild, non regenerative



Serum biochem

Increased liver enzymes

Hyperbilirubinaemia

Hyperlipidaemia

Hypoalbuminaemia

Pre-renal or renal azotemia

Electrolytes imbalance

Clinical, clinicopathologic, radiographic, and ultrasonographic abnormalities in dogs with fatal acute pancreatitis: 70 cases (1986–1995)

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Frances S. Shofer, PhD; Robert J. Washabau, VMD, PhD

J Vet Intern Med 2016;30:116–122

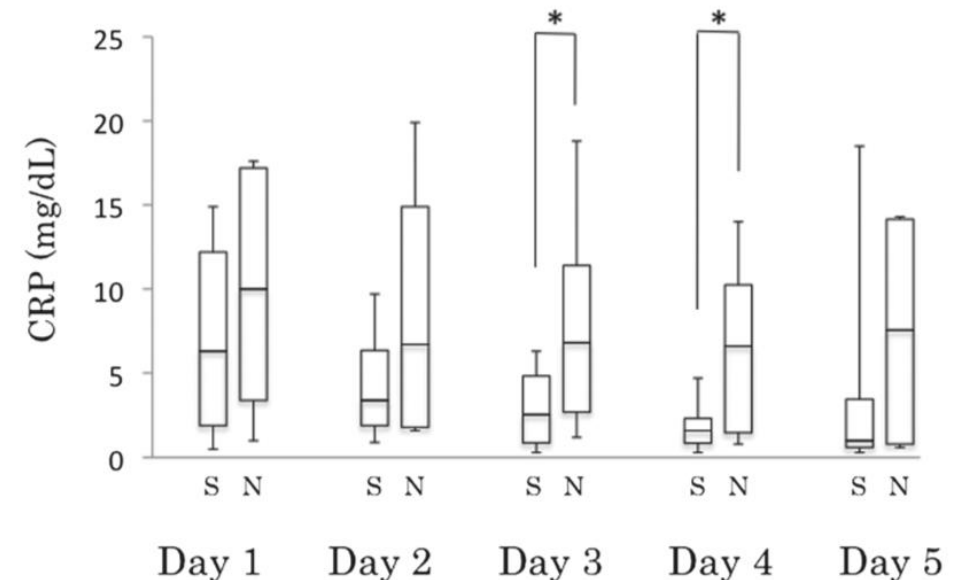
Clinical Utility of Diagnostic Laboratory Tests in Dogs with Acute Pancreatitis: A Retrospective Investigation in a Primary Care Hospital

M. Yuki, T. Hirano, N. Nagata, S. Kitano, K. Imataka, R. Tawada, R. Shimada, and M. Ogawa

Serum C reactive protein

Increased in 90% of cases of AP in dogs

Decrease associated with survival to discharge



S: Group S
N: Group N

Haemostasis

Nielsen et al, 2019

38% thrombosis

55% portal vein thrombosis

AP included by ACVECC consensus as major indication for institution of prophylactic anti-platelet and anticoagulant therapy

[J Vet Emerg Crit Care \(San Antonio\)](#). 2019 May;29(3):264-268. doi: 10.1111/vec.12840. Epub 2019 Apr 29.

Multicenter investigation of hemostatic dysfunction in 15 dogs with acute pancreatitis.

Nielsen L¹, Holm J¹, Rozanski E², Meola D², Price LL^{3,4}, de Laforcade A².

Pancreatic «specific» tests

Immunological methods

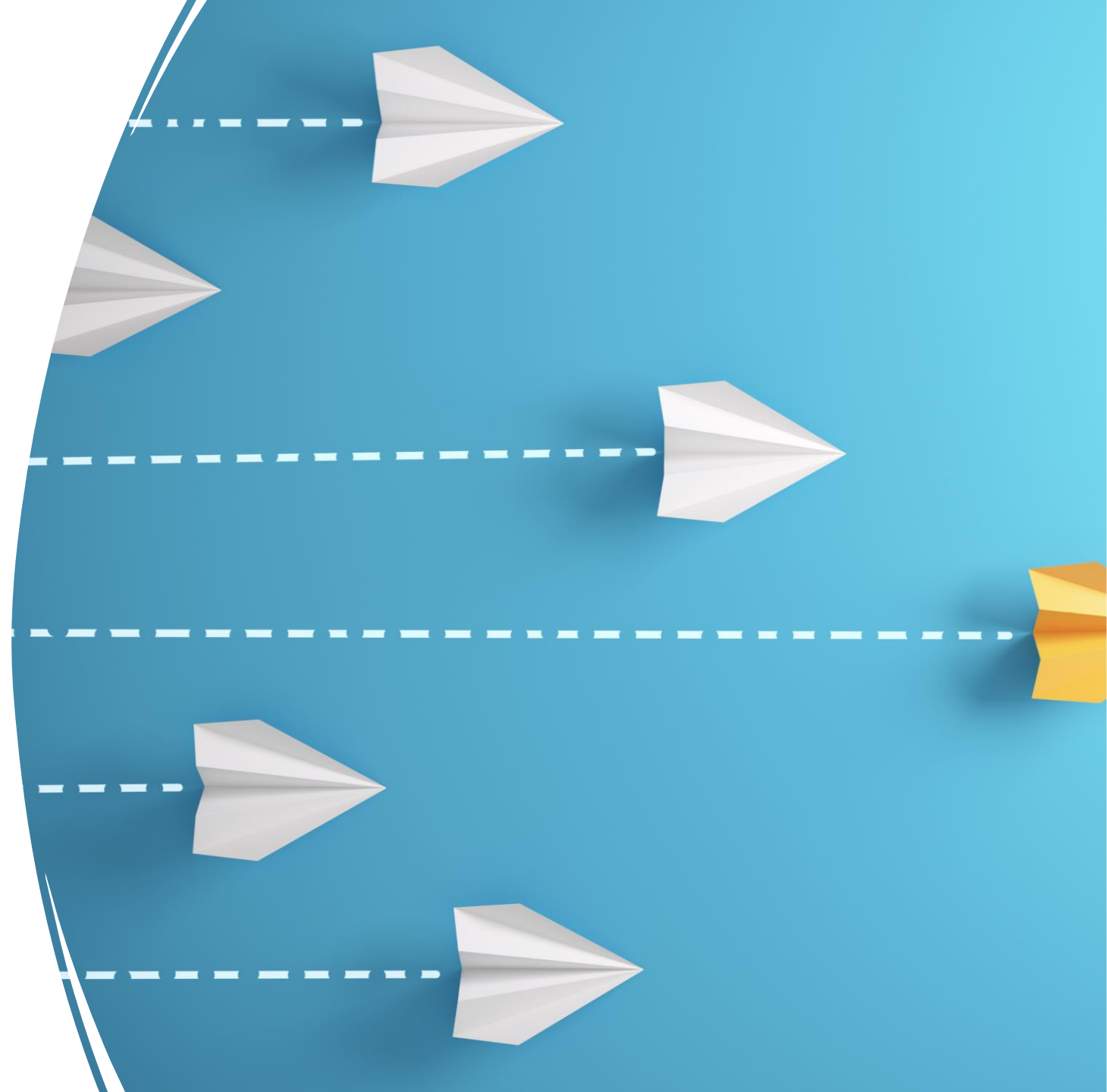
cPLI (Spec cPL®)

fPLI (Spec fPL®)

SNAP c/f PL®

Catalytic methods

Lipase DGGR



Pancreatic lipase immunoreactivity (PLI)

Spec cPL™ (& Spec fPL™)

Considered the most sensitive and specific marker for the diagnosis of pancreatitis

ELISA method (monoclonal antibodies)

Analytically validated in dogs and cats

Not affected by jaundice, hemolysis, lipemia



Article

Development and analytic validation of an enzyme-linked immunosorbent assay for the measurement of canine pancreatic lipase immunoreactivity in serum

Jörg M. Steiner, Sheila R. Teague, David A. Williams

IDEXX



Article

Development and analytical validation of a radioimmunoassay for the measurement of feline pancreatic lipase immunoreactivity in serum

Jörg M. Steiner, Ben G. Wilson, David A. Williams

Interpretation



0-200 ug/L pancreatitis unlikely
200-400 ug/L pancreatitis possible
> 400 ug/L pancreatitis probable

	Cut-off 200	400
Sensitivity	43-94%	21-90%
Specificity	66-95%	74-100%

Clinical performance - dog

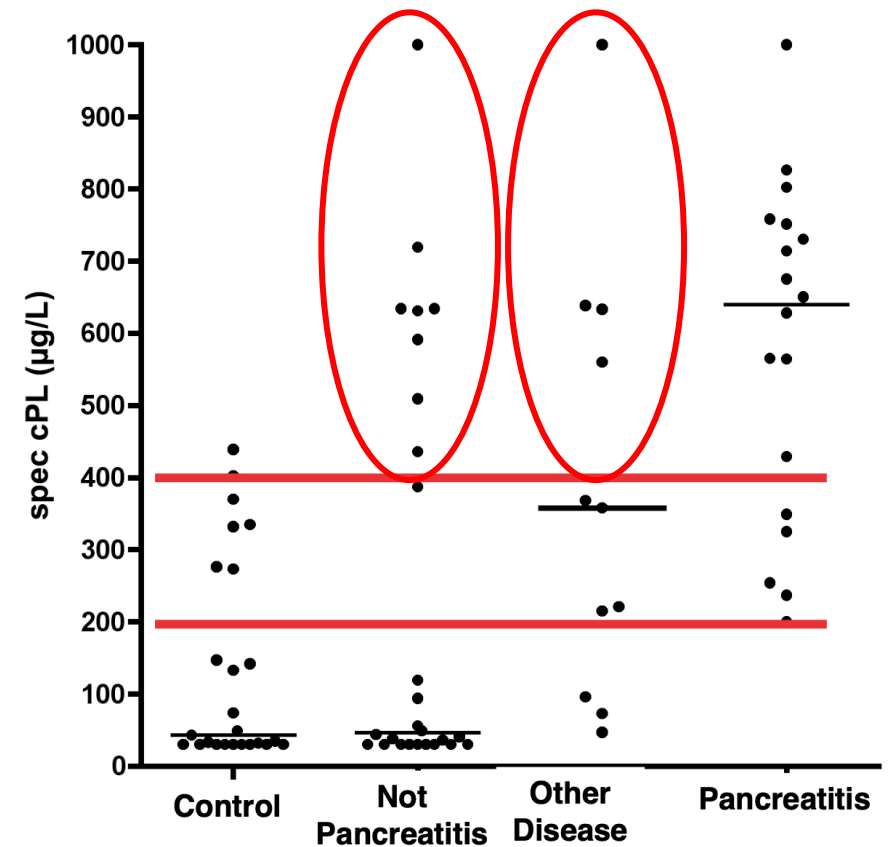
McCord et al, 2012

84 dogs

Spec cPL < 200 mcg/L tends to rule out pancreatitis in low-risk population

Up to 20% of patients deemed not to have pancreatitis had >400 mcg/L

Absence of linearity between disease increase and severity or prognosis

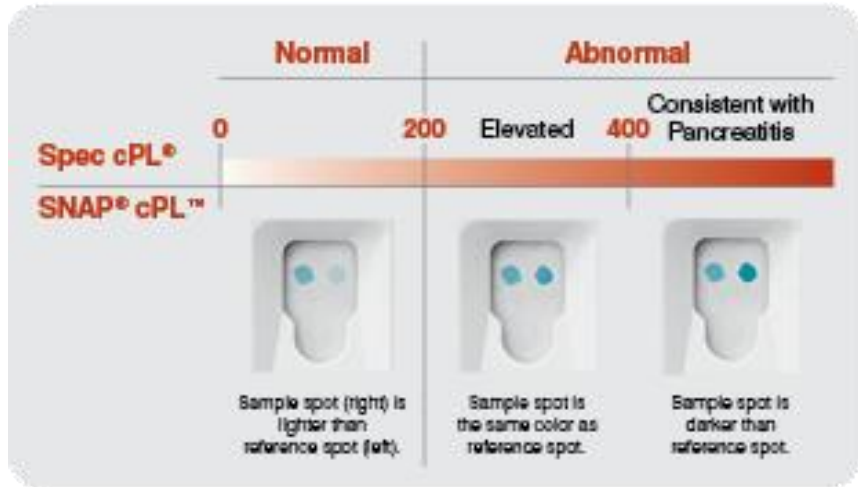


J Vet Intern Med 2012;26:888-896

A Multi-Institutional Study Evaluating the Diagnostic Utility of the Spec cPLTM and SNAP[®] cPLTM in Clinical Acute Pancreatitis in 84 Dogs

K. McCord, P.S. Morley, J. Armstrong, K. Simpson, M. Rishniw, M.A. Forman, D. Biller, N. Parnell, K. Arnell, S. Hill, S. Avgeris, H. Gittelman, M. Moore, M. Hitt, G. Oswald, S. Marks, D. Burney, and D. Twedt

Lateral flow immunoassay – SNAP c/fPL™



94.0% - 97.4% agreement with Spec cPL

J Vet Intern Med 2012;26:888–896

A Multi-Institutional Study Evaluating the Diagnostic Utility of the Spec cPL™ and SNAP® cPL™ in Clinical Acute Pancreatitis in 84 Dogs

K. McCord, P.S. Morley, J. Armstrong, K. Simpson, M. Rishniw, M.A. Forman, D. Biller, N. Parnell, K. Arnell, S. Hill, S. Avgeris, H. Gittelman, M. Moore, M. Hitt, G. Oswald, S. Marks, D. Burney, and D. Twedt

97.5% agreement for negative/normal
90% for positive results

DGGR lipase

1,2 dilauryl-rac-glycero-3 glutaric acid ester

Substrate hydrolysed by pancreatic lipase (but not only)

Kook et al, 2014

Good agreement with Spec cPL when > 216 U/L

Sensitivity and specificity similar to Spec cPL

Agreement (valore k, 95% CI)

	Spec cPL >200 µg/L	Spec cPL >400 µg/L
Lipase >108 U/L	0.795 (CI, 0.69–0.9)	0.551 (CI, 0.43–0.67)
Lipase >162 U/L	0.753 (CI, 0.64–0.86)	0.774 (CI, 0.67–0.88)
Lipase >216 U/L	0.699 (CI, 0.58–0.82)	0.803 (CI, 0.71–0.9)

J Vet Intern Med 2014;28:863–870

Agreement of Serum Spec cPL with the 1,2-o-Dilauryl-Rac-Glycero Glutaric Acid-(6'-methylresorufin) Ester (DGGR) Lipase Assay and with Pancreatic Ultrasonography in Dogs with Suspected Pancreatitis

P.H. Kook, N. Kohler, S. Hartnack, B. Riond, and C.E. Reusch

DGGR lipase - limitations

Reflects activity of other isoenzymes (hepatic, gastric)

Increases with reduced GFR (reduced clearance)

Increases with hyperadrenocorticism and glucocorticoid therapy (markedly)

High variability between assays on the market

> [Can Vet J.](#) 2020 Jul;61(7):743-748.

Evaluation of 1,2-O-dilauryl-rac-glycero-3-glutaric acid-(6'-methylresorufin) ester lipase concentrations in cats with kidney disease and with normal SNAP fPL

Anne-Sophie Bua ¹, Carolyn Grimes ¹, Guy Beauchamp ¹, Marilyn E Dunn ¹

> [J Vet Intern Med.](#) 2020 Nov;34(6):2330-2336. doi: 10.1111/jvim.15946. Epub 2020 Nov 4.

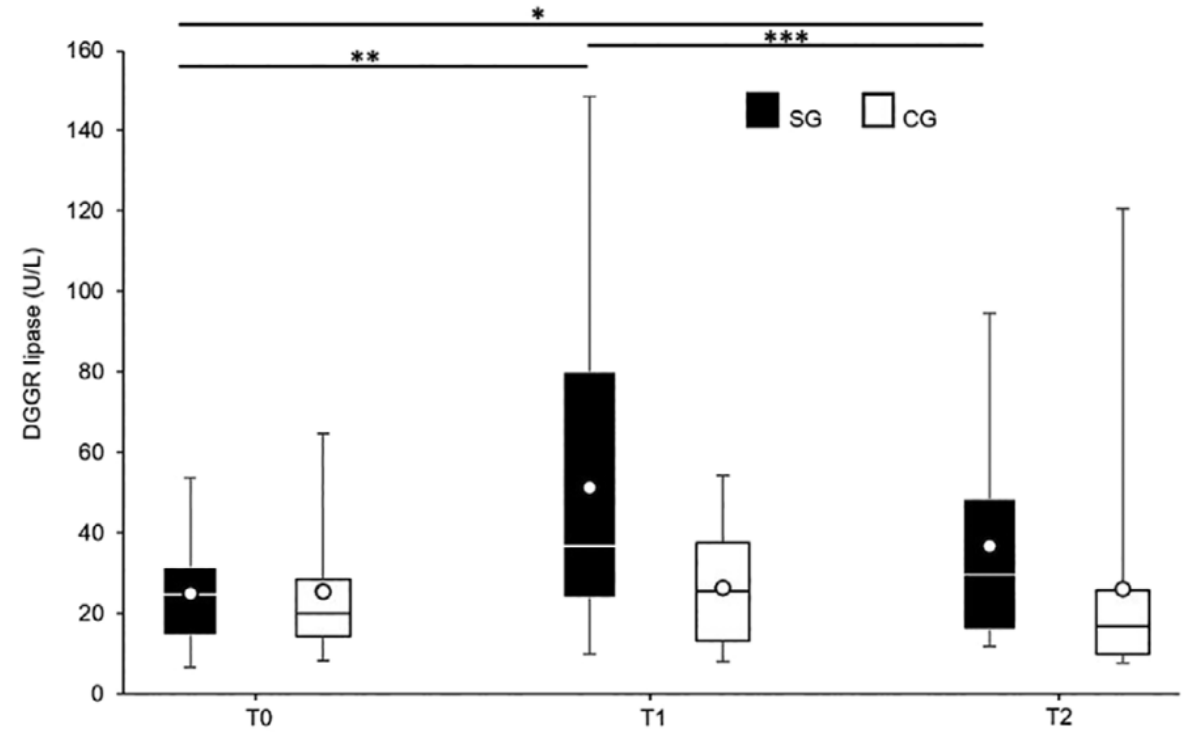
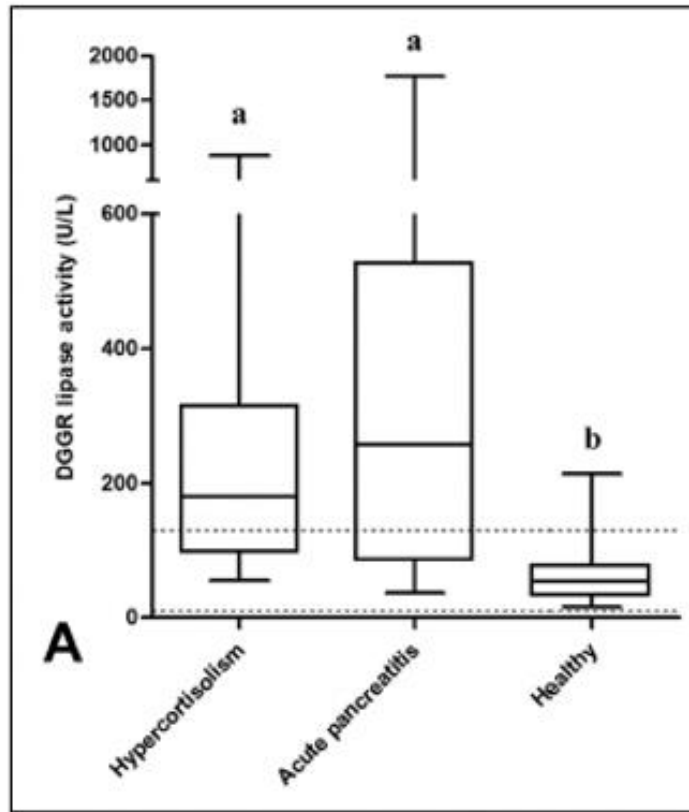
Effect of prednisolone therapy on serum levels of 1,2-O-dilauryl-rac-glycero glutaric acid-(6'-methylresorufin) ester lipase in dogs

Beatriz Mendoza ¹, Maria Joana Dias ¹, Telmo Nunes ¹, Maria Alexandra Basso ¹, Juan Hernandez ², Rodolfo Oliveira Leal ^{1, 3}

> [J Vet Diagn Invest.](#) 2021 Sep;33(5):817-824. doi: 10.1177/10406387211021345. Epub 2021 Jun 2.

Evaluation of 1,2-O-dilauryl-rac-glycero glutaric acid-(6'-methylresorufin) ester (DGGR) and 1,2-diglyceride lipase assays in dogs with naturally occurring hypercortisolism

Guido Linari ¹, Francesco Dondi ¹, Sofia Segatore ¹, Kateryna Vasylyeva ¹, Nikolina Linta ¹, Marco Pietra ¹, Rodolfo O Leal ², Federico Fracassi ¹



> J Vet Diagn Invest. 2021 Sep;33(5):817-824. doi: 10.1177/10406387211021345.

Epub 2021 Jun 2.

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Guido Linari¹, Francesco Dondi¹, Sofia Segatore¹, Kateryna Vasylieva¹, Nikolina Linta¹, Marco Pietra¹, Rodolfo O Leal², Federico Fracassi¹

Received: 28 July 2020 | Accepted: 13 October 2020

DOI: 10.1111/jvim.15946

STANDARD ARTICLE

Journal of Veterinary Internal Medicine **ACVIM**
American College of Veterinary Internal Medicine

Effect of prednisolone therapy on serum levels of 1,2-O-dilauryl-*rac*-glycero glutaric acid-(6'-methylresorufin) ester lipase in dogs

Beatriz Mendoza¹ | Maria Joana Dias¹ | Telmo Nunes¹ |
Maria Alexandra Basso¹ | Juan Hernandez² | Rodolfo Oliveira Leal^{1,3}

Introducing the Catalyst[®] Pancreatic Lipase Test



+ Real-time diagnoses with results in less than 10 minutes.



+ Accurate and specific quantitative results that align with the IDEXX Reference Laboratories Spec cPL[®] and Spec fPL[®] tests.



+ One test validated for both dogs and cats.



+ Flexible testing that allows running alone or with additional chemistry tests in a single run using one sample.



+ Load-and-go workflow that provides results in real time.



+ Integrated results with other diagnostic testing on VetConnect[®] PLUS.



Strong agreement between Catalyst[®] Pancreatic Lipase Test and Spec[®] cPL[™]



Overall agreement 84.8%				
		Spec cPL		
		≤ 200 µg/L	201–399 µg/L	≥ 400 µg/L
Catalyst PL	≤ 200 U/L	51.4%	6.2%	0.0%
	201–399 U/L	1.8%	13.0%	2.8%
	≥ 400 U/L	0.0%	4.5%	20.4%



		Spec cPL			
		≤ 200 µg/L	201–399 µg/L	≥ 400 µg/L	
Catalyst PL	≤ 200 U/L	89.3%	10.7%	0.0%	100%
	201–399 U/L	10.4%	73.9%	15.7%	100%
	≥ 400 U/L	0.0%	17.9%	82.1%	100%

Monitoring over time

Cueni et al, 2023

39 dogs hospitalised with AP

Spec cPL e DGGR lipase normalised within 2 days in 50% cases

sCRP remained increased in majority of dogs at day 3

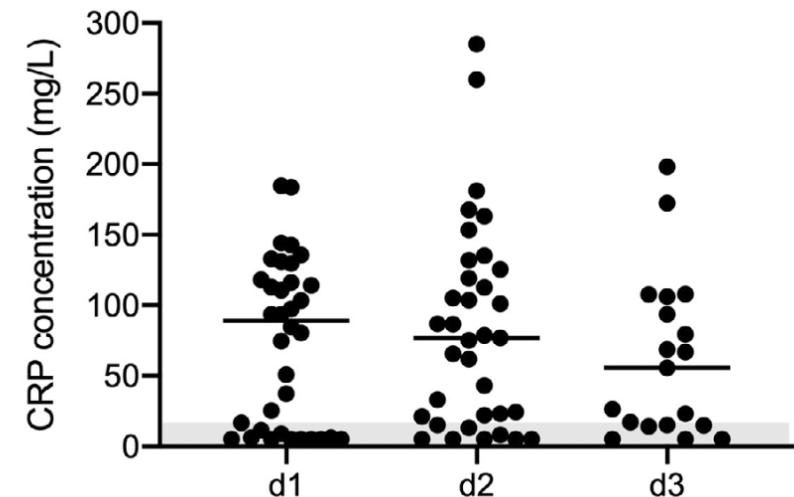
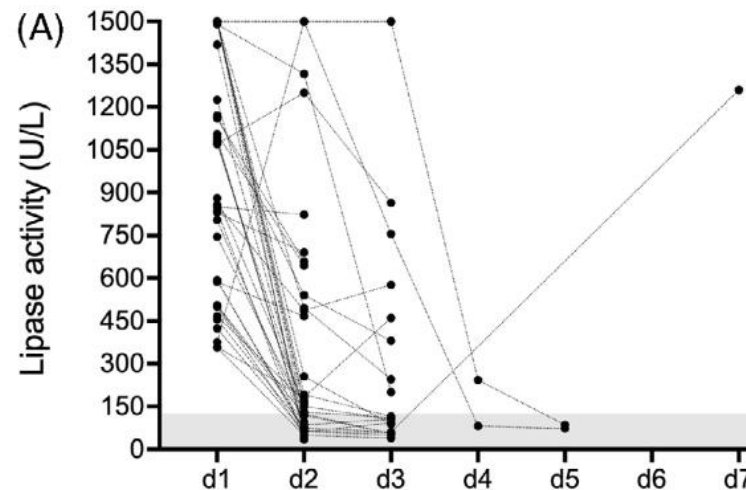
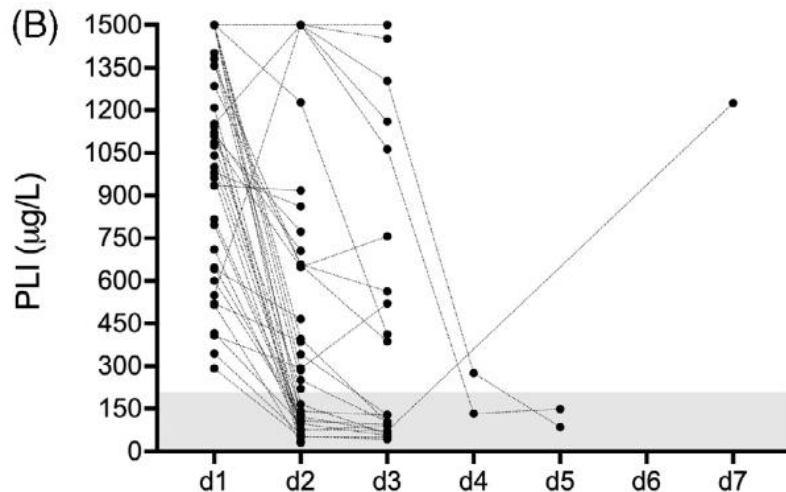
Received: 16 July 2022 | Accepted: 16 November 2022
DOI: 10.1111/jvim.16591

STANDARD ARTICLE

Journal of Veterinary Internal Medicine **ACVIM**
American College of Veterinary Internal Medicine
Open Access

Progression of lipase activity and pancreatic lipase immunoreactivity in dogs hospitalized for acute pancreatitis and correlation with clinical features

Claudia Cueni | Natalie Hofer-Inteeworn | Claudia Kümmerle-Fraune |
Claudia Müller | Peter Hendrik Kook 



Abdominal ultrasound

DI modality of choice

Dogs < 25 kg bw – once analgesic control achieved

Variables of interest

Pancreatic echogenicity and volume

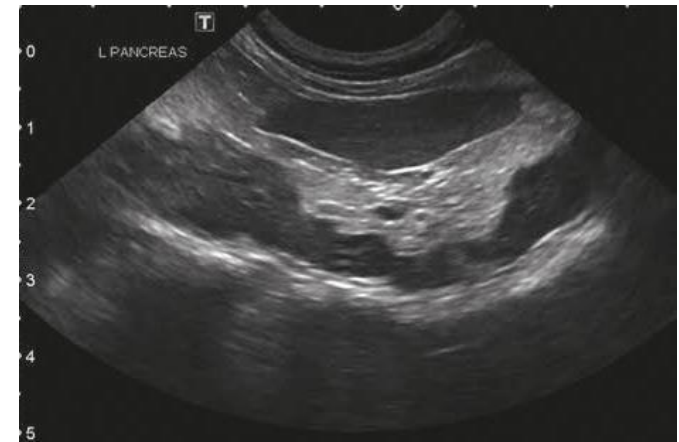
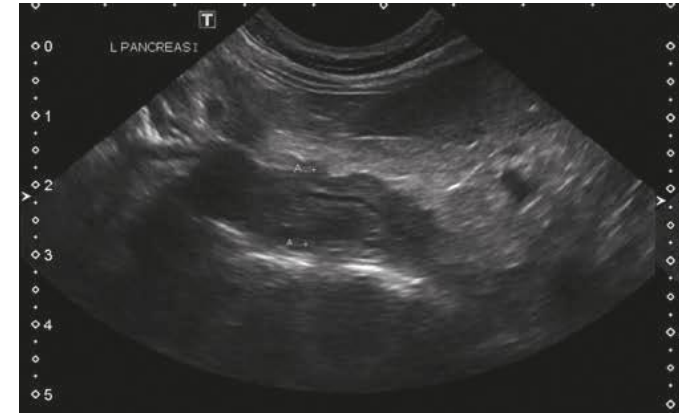
Echogenicity of peripancreatic fat

Pancreatic-duodenal LN

Duodenal corrugation

Pancreatic and biliary duct

Abdominal effusion



Performance variable (AP > CP)

Sensitivity 43-89%

Specificity 43 -92%

Abdominal ultrasound – considerations

Contraindicated if acute abdominal pain not controlled

Operator-dependant

Findings dependent on severity and duration of disease

Lag-phase 1-4 gg vs clinical signs and lipases (Gori et al, 2021)

Concordance with Spec fPL and DGGR lipase variable

Ultrasonographic remission slow vs clinical signs

Performance variable (AP > CP)

Sensitivity 43-89%

Specificity 43 -92%

> [J Am Vet Med Assoc. 2021 Sep 15;259\(6\):631-636. doi: 10.2460/javma.259.6.631.](#)

Evaluation of diagnostic and prognostic usefulness of abdominal ultrasonography in dogs with clinical signs of acute pancreatitis

Eleonora Gori, Alessio Pierini, Ilaria Lippi, Simonetta Citi, Tommaso Mannucci, Veronica Marchetti

Grace

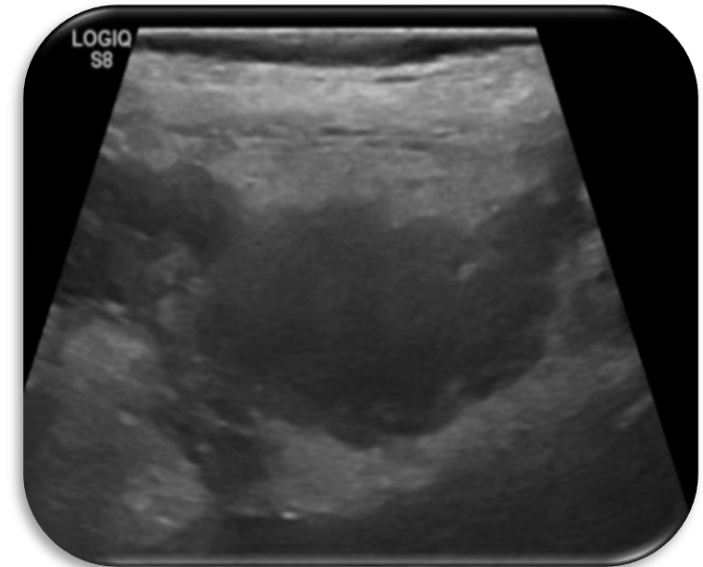
Border collie - 10 yrs old FN

Acute abdomen + severe
vomiting after dietary
indiscretion

BCS 7/9

sCRP 13.9 mg/L

Spec cPL > 2,000 ug/L



Grace – 1 month later

No clinical signs

sCRP < 0.01 mg/L

Spec cPL 60 ug/L



Pancreatic histopathology

Needed for definitive diagnosis and classification

Limitations:

Invasive

Expensive

Need for multiple biopsies (multifocal/patchy pathology)

Equivocal significance of histological evidence in the absence of clinical symptoms

Little impact on treatment strategy

Brief Communications

J Vet Diagn Invest 18:115–118 (2006)

Histologic assessment and grading of the exocrine pancreas in the dog

S. J. Newman,¹ J. M. Steiner, K. Woosley, D. A. Williams, L. Barton

Cytology

Minimally invasive

Safe - complication rate 3% (*Crain et al 2014*)

Bleeding

Hypotension

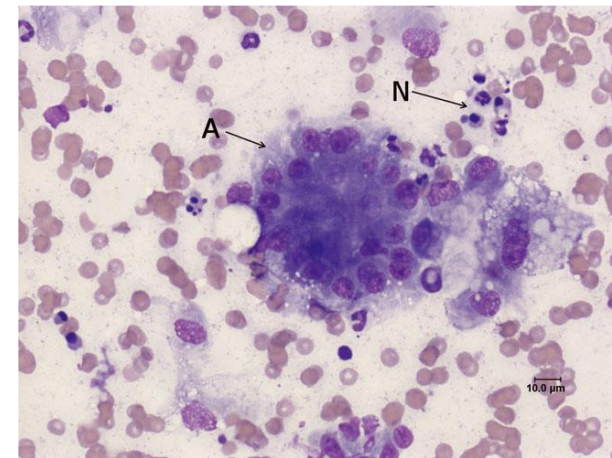
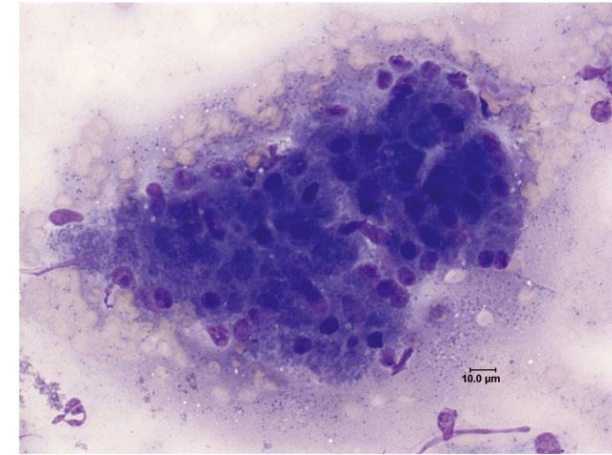
Findings

Acinar epithelial degeneration

Neutrophils

Necrosis

CP often acellular



J Vet Diagn Invest 22:702-707 (2010)

**Effect of pancreatic tissue sampling on serum pancreatic enzyme levels
in clinically healthy dogs**

Amy P. Cordner, P. Jane Armstrong,¹ Shelley J. Newman, Roberto Novo, Leslie C. Sharkey,
Carl Jessen (*emeritus*)

Understanding lipase assays in the diagnosis of pancreatitis in veterinary medicine

Sue Yee Lim, DVM, PhD¹; Jörg M. Steiner, DVM, PhD, DACVIM, DECVIM¹; Harry Cridge, MVB, MS, DACVIM, DECVIM^{2*}

¹Gastrointestinal Laboratory, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX

²Department of Small Animal Clinical Sciences, College of Veterinary Medicine, Michigan State University, East Lansing, MI

Proposed interpretive criteria:

Criteria for **clinically probable acute pancreatitis**:

- > cut-off value for pancreatic lipase concentration or activity
- ≥ 2 sonographic features of acute pancreatitis (or CTA evidence of acute pancreatitis).²

Criteria for **clinically suspect acute pancreatitis**:

- > cut-off value for pancreatic lipase concentration or activity + < 2 sonographic features of acute pancreatitis.²
- Or equivocal pancreatic lipase concentration or activity + ≥ 2 sonographic features of acute pancreatitis
- Clinical action: repeat imaging &/or pancreatic lipase measurement over time is indicated. Sonographic features of acute pancreatitis can lag behind elevated pancreatic lipase increase. Consider pancreatic fine needle aspirate.

Unlikely to be acute pancreatitis:

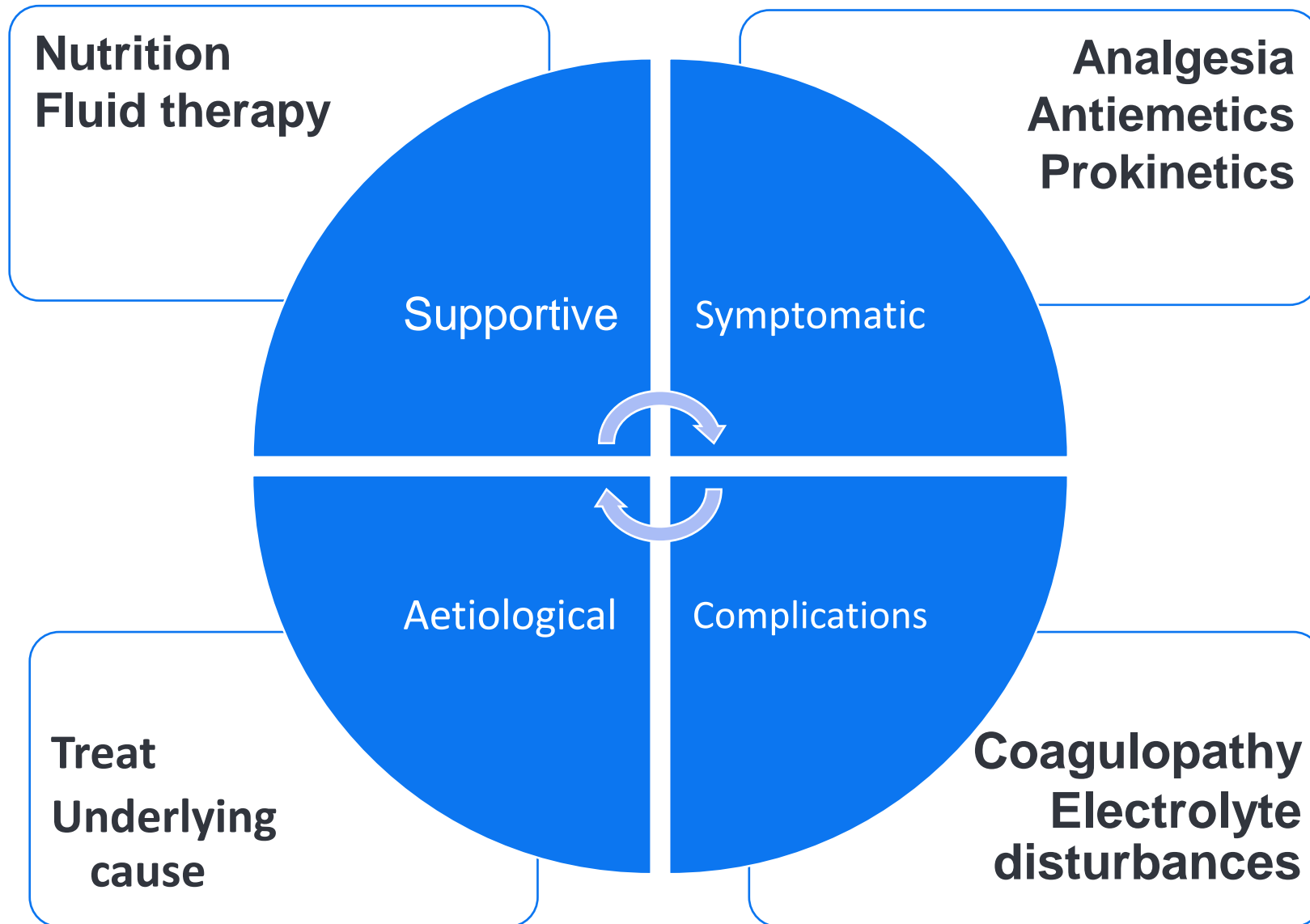
- Within reference interval pancreatic lipase concentration or activity
- < 2 sonographic features of acute pancreatitis

Figure 3—Decision tree for interpretation of lipase assays in the context of a clinical patient.

Managing acute pancreatitis in dogs



Management



Analgesia

Uncontrolled visceral pain can

- Reduce appetite and induce malnutrition
- Increase stress cardiovascular stress
- Increase peripheral O₂ consumption
- Activate inflammatory cascade (neurogenic)
- Reduce gastrointestinal motility

Clinical signs indicative of pain

- Tachycardia
- Hypertension
- Tachypnea
- Lethargy or agitation
- Hyperthermia
- Anorexia

Individualised approach

Table 3. An outline of the levels of pain that are potentially manifested in dogs with acute pancreatitis, as adapted from the Glasgow Composite Pain Scale and recommended analgesia

Anticipated levels of pain associated with acute pancreatitis		Potential analgesic combination	Level of evidence
Mild	Quiet but responsive to surroundings; unsettled; looks around when abdomen is palpated	<u>Buprenorphine or methadone</u> (or other full μ -agonist) at high-end of dosage and frequency, reducing down once pain well controlled	D (dogs)
Moderate	Decreased response to surroundings or stimuli; slow or reluctant to move; restless; stretching of abdomen, looking around at abdomen; flinches on abdominal palpation	<u>Buprenorphine or methadone</u> (or other full μ -agonist) at high-end of dosage and frequency, <u>PLUS Lidocaine and Ketamine infusion</u> . Once pain well controlled, reduce ketamine infusion first until 5 $\mu\text{g}/\text{kg}/\text{minute}$ then stop, then reduce lidocaine until 25 $\mu\text{g}/\text{kg}/\text{minute}$ then stop, then reduce dosage and frequency of opioid.	D (dogs)
Severe to excruciating	Non-responsive to stimuli; refuses to move or get up; screams, cries or snaps when tries to get up or abdomen palpated	<u>Epidural morphine or fentanyl infusion PLUS lidocaine/ketamine infusion</u> . Once pain well controlled, change epidural to opioid as above, then reduce ketamine infusion first until 5 $\mu\text{g}/\text{kg}/\text{minute}$, stop and then reduce lidocaine until 25 $\mu\text{g}/\text{kg}/\text{minute}$, then stop, and then reduce dosage and frequency of opioid.	D (dogs)
Unexpected exacerbation of pain		Assess for pancreatic fluid collection and aspirate via ultrasound guidance	C (dogs)
Adjunctive management	Added with any level of pain Added if opioids associated with decreased gastrointestinal motility	<u>Gabapentin</u> Methylnaltrexone	D (dogs) D (dogs) C (humans)

LOE Level of evidence

The LOE is determined as described in Table 1

Fluid therapy

Correct dehydration and/or hypovolaemia

Re-establish pancreatic perfusion

Avoid ischemia and thrombosis

Correct electrolytes imbalance

Type and rate of fluids based on patient evaluation

MMs, CRT, lactate, SIBP



Individualised approach

For dehydrated patients:

Isotonic solutions

Maintenance + % dehydration + ongoing losses

(40-60ml/kg/h) + (in 6-24 hours) + (estimate volume of V/D)

For hypovolemic/«shocky» patients

Isotonic solutions (rarely hypertonic or natural colloids)

EV boluses of 10 ml/kg (5ml/kg cats) over 15 minutes with re-evaluation

In case of AKI

Ins and outs: fluid going in match fluids going out (insensible losses + volume of urine, V/D)

Nutritional support - early

Consequences of prolonged fasting

Intestinal villi atrophy/ apoptosis of enterocytes

Decrease in goblet and deep crypt cells

Reduced transport of glutamine and arginine

Increased intestinal permeability

Risk of bacterial translocation

Mansfield et al, 2008

Lack of return to enteral nutrition for ≥ 3 days associated with negative outcome



Nutritional management of acute pancreatitis in dogs and cats

Kristine B. Jensen, DVM, MVetMed, MRCVS and Daniel L. Chan, DVM, DACVECC, DACVN, MRCVS

> [J Am Vet Med Assoc. 2008 Sep 15;233\(6\):936-44. doi: 10.2460/javma.233.6.936.](#)

Development of a clinical severity index for dogs with acute pancreatitis

[Caroline S Mansfield](#)¹, [Fleur E James](#), [Ian D Robertson](#)

Individualised management

Feeding tubes

Nasoesophageal or nasogastric vs esophagostomic

Jejunostomy in case of uncontrollable vomiting or severe ileus

Which diet?

Highly digestible

Energy dense

Low-fat in case of hyperlipidaemia

Antibiotics

No scientific evidence to support systemic use

Can cause

Dysbiosis

GI toxicity

Antibiotic resistance

Consider only in case of suspected SEPSIS,
aspiration pneumonia, bacterial translocation

Use antibiotics that are effective against
enterobacteria

Amoxicillin + clavulanate or cephalexin
20mg/kg IV q8 hours



The graphic is a certificate titled "ANTIBIOTIC GUARDIAN CERTIFICATE" with a logo of two hands holding a pill. Below the title, it reads "I have pledged to be an **ANTIBIOTIC GUARDIAN** My actions protect antibiotics". At the bottom, it says "Become an Antibiotic Guardian. Join me at antibioticguardian.com". Logos for UK Health Security Agency, HSC Health and Social Care, Keep Antibiotics Working, NHS SCOTLAND, and GIG NHS are at the bottom.

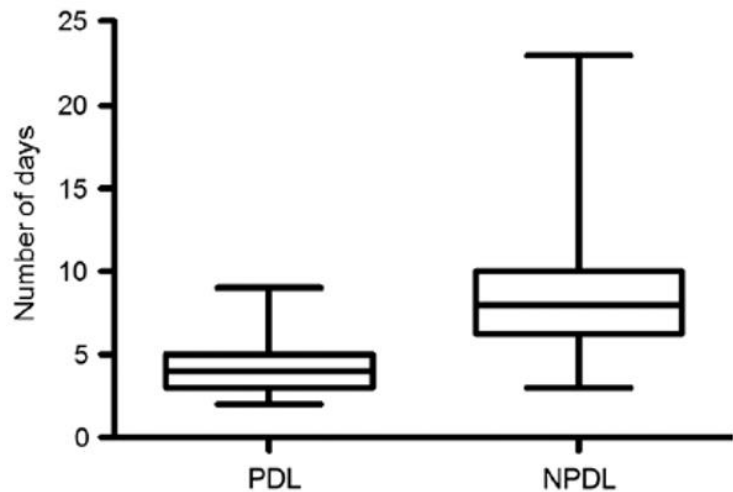
ANTIBIOTIC GUARDIAN CERTIFICATE

I have pledged to be an
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My actions protect antibiotics

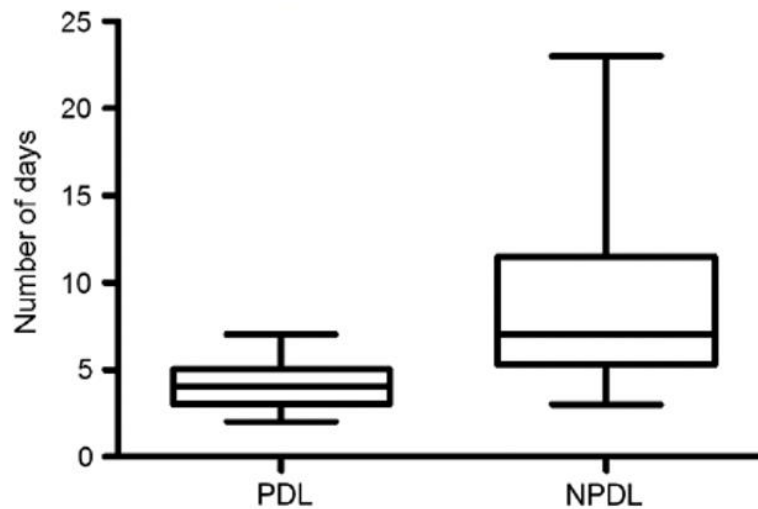
Become an Antibiotic Guardian. Join me at antibioticguardian.com

UK Health Security Agency | HSC Health and Social Care | Keep Antibiotics Working | NHS SCOTLAND | GIG NHS

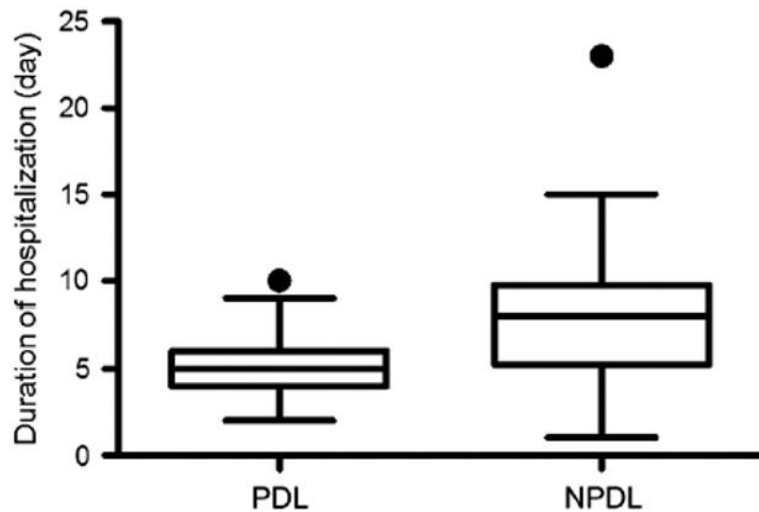
Time to CRP < 2mg/dL



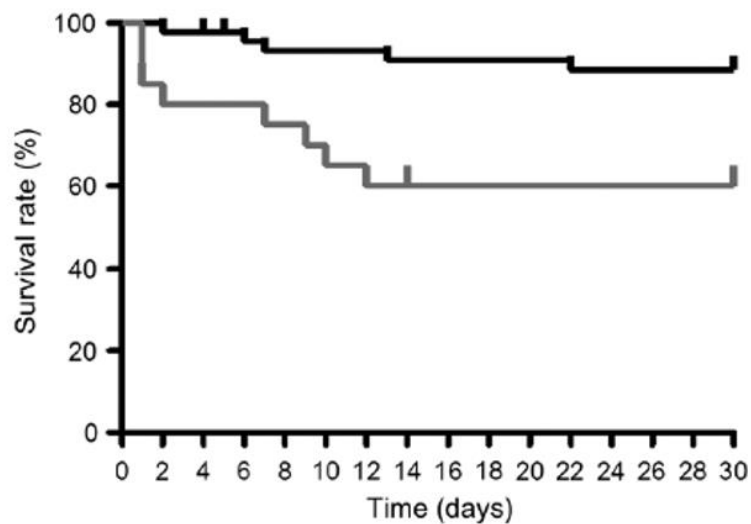
Clinical score



Hosp days



Survival time



Surgery

In case of complete EHBO
Cholecystoduodenostomy
Stenting

Necrotising pancreatitis and peritonitis
Peritoneal lavage
Abscesses
Omentalisation

High mortality rate
50-86%



**Treatment for pancreatic abscesses
via omentalization with abdominal closure
versus open peritoneal drainage in dogs:
15 cases (1994–2004)**



Matthew D. Johnson, DVM, and F. A. Mann, DVM, MS, DACVS, DACVECC

> [J Am Anim Hosp Assoc.](#) 2008 Jul-Aug;44(4):171-9. doi: 10.5326/0440171.

**Pancreatic abscess in 36 dogs: a retrospective
analysis of prognostic indicators**

Jonathan R Anderson ¹, Karen K Cornell, Nolie K Parnell, S Kathleen Salisbury

Medical and surgical management of pancreatic fluid accumulations in dogs: A retrospective study of 15 cases

Charles T. Talbot¹  | Ring Cheung² | Emma J. Holmes³ | Simon D. Cook¹ 

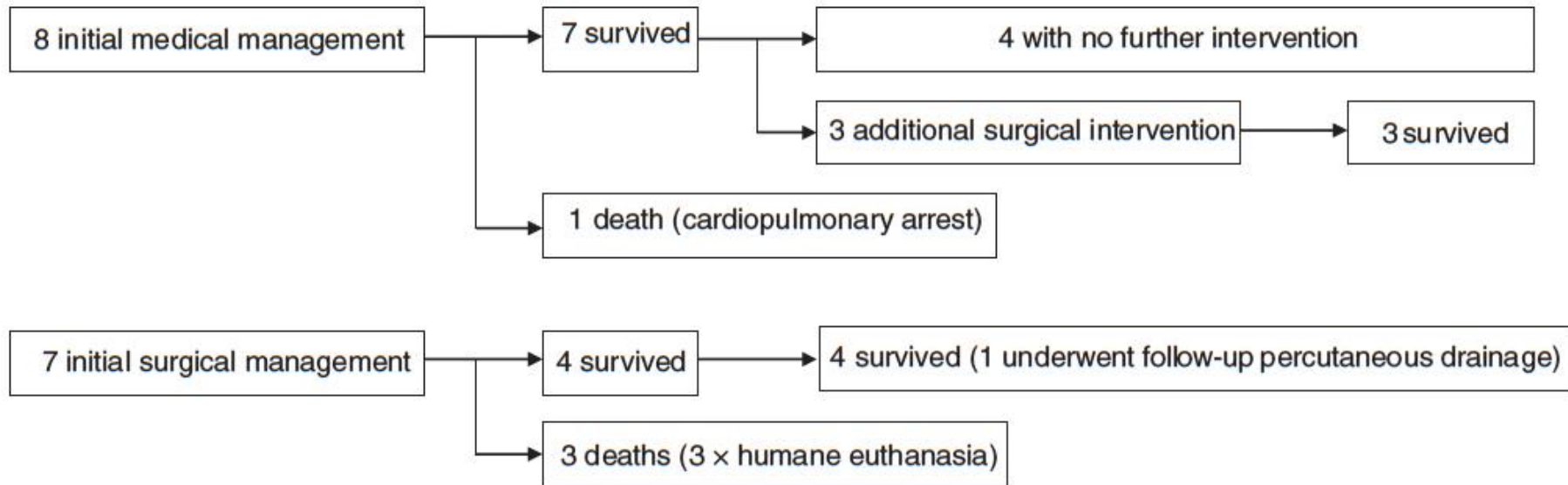


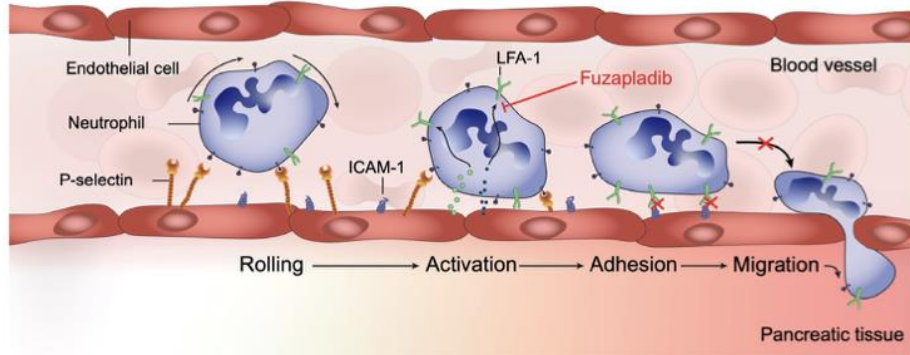
FIGURE 1 Management and survival of medically and surgically managed cases with pancreatic fluid accumulation

Fuzapladib (Panoquell®- CA1)

Leukocyte function-associated 1 (LFA-1) antagonist

LFA-1 expressed on neutrophils

Binds ICAM-1 expressed on endothelium

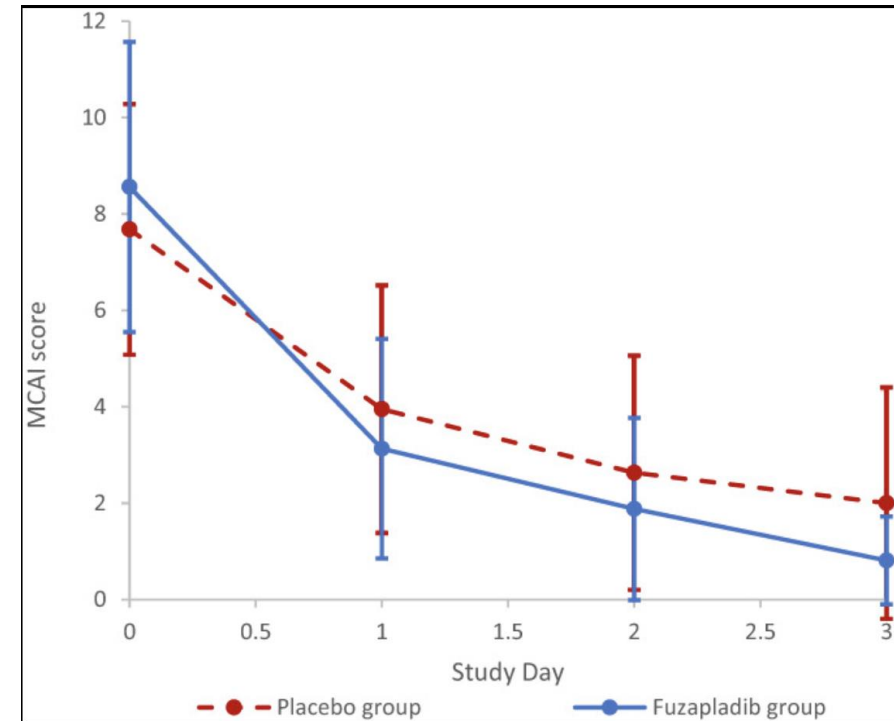
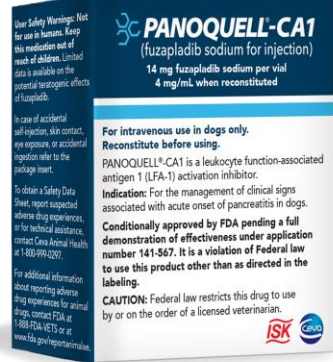


Steiner et al, JVIM 2023

61 dogs with presumptive AP

Safety study followed by efficacy study (n35)

16n Fuza 0.4 mg/kg IV for 3 days vs 19n placebo



Steiner JM, Lainesse C, Noshiro Y, et al. *J Vet Intern Med* 2023; 37(6): 2084-2092.

Prognosis

Mortality 27-58%

Putative negative prognostic markers

CRP

Thrombocytopenia

Dyspnea

Ascites

SIRS coagulopathy, hypocalcaemia,
azotemia

UPC ratio >2

Mansfield et al. 2008

Kathrani et al. 2009

Papa et al. 2011

Stockhaus et al. 2013

Tvarijonaviciute et al. 2014

Marchetti et al. 2017

Fabres et al. 2019

Kuzi et al. 2019

Fabres et al. 2019

Gori et al. 2019

CRP vs Spec cPL – prediction of survival

Oberholtzer et al, 2024 - 503 dogs with cPLI and CRP

143 (27%) hospitalized

49 (9.7%) deceased or euthanised

Spec cPL hospitalized vs discharged dogs overlapping

Median sCRP in hospitalised (36.1 vs 9.9 mg/L) vs
deceased (37.2 vs 9.9 mg/L)

Dogs with baseline CRP > 10 mg/L 5x risk of death

JAVMA



**Prognostic value of C-reactive protein in dogs
with elevated serum pancreatic lipase
immunoreactivity concentrations**

Sydney M. Oberholtzer, DVM^{1*}; Audrey K. Cook, BVM&S, MSc Vet Ed, DACVIM, DECVIM, DABVP¹;
Robynne Gomez, MS²; Iara M. Steiner, MedVet, DrMedVet, PhD, DACVIM, DECVIM^{1,2}



Thank you very much
for the attention!

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Questions?

