AVALIAÇÃO LABORATORIAL DO PÂNCREAS EXÓCRINO

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PÂNCREAS

- Principal função exócrina = produção, secreção e estoque de enzimas digestivas (gordura, proteínas e polissacarideos)
- Cães: Possuem dois ductos pancreáticos (principal e acessório)
- Gatos: Ducto biliar principal muito próximo ao ducto biliar

PANCREATITE AGUDA

- Predisposição: cães de meia idade ou idosos, Terriers, Cocker, gatos de pêlo curto
- Fatores:
  - Obesidade e dietas ricas em gorduras
  - Isquemia
  - Hiperlipoproteinemia
  - Fármacos (Corticóides, azatioprina, brometo de potássio, furosemida, tetraciclinas entre outros)
  - Refluxo duodenal
  - Trauma
  - Hipercalcemia
  - Hiperadrenocorticismo

PANCREATITE AGUDA

- Sinais clínicos:
  - Desidratação (97%)
  - Anorexia (91%)
  - Vômitos (90%)
  - Fraqueza (79%)
  - Dor abdominal difusa (58%)
  - Diarréia hemorrágica (33%)
  - Icterícia (32%)
  - Insuficiência Renal
  - Choque
  - Febre
  - Depressão
  - CID

Foto: Nelson & Couto, Medicina interna de pequenos animais

J Am Vet Med Assoc. 1998 Sep 1;213(5):665-70.

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

Hess RS, Saunders HM, Van Winkle TJ, Shofer FS, Washabau RJ.

Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania, Philadelphia 19104-6010, USA.

Abstract

OBJECTIVE: To determine clinical, clinicopathologic, radiographic, ultrasonographic, and coagulation abnormalities in dogs in which acute pancreatitis was fatal.

DESIGN: Retrospective study.

ANIMALS: 70 dogs.

PROCEDURE: History, clinical signs, and physical examination findings at the time of initial evaluation at the veterinary teaching hospital; results of pretreatment laboratory tests, abdominal radiography, and ultrasonography; and histologic abnormalities were obtained from medical records.

RESULTS: Clinical signs included anorexia, vomiting, Weakness, diarrhea, polyuria and polydipsia, neurologic abnormalities, melena, weight loss, hematemesis, and passage of frank blood in feces. At the time of initial examination at the veterinary teaching hospital, 68 (97%) dogs were dehydrated, 18 (26%) were icteric, 22 (32%) were febrile, 40 (58%) had signs of abdominal pain, and 30 (43%) were classified as overweight or obese. Most dogs had leukocytosis, neutrophilia with a left shift, and thrombocytopenia. Various serum biochemical abnormalities were identified, including hypoglycemia, azotemia, hypercalcemia and other electrolyte abnormalities, hypoalbuminemia, high hepatic and pancreatic enzyme activities, hypercholesterolemia, and lipemia. For 17 of 28 (61%) dogs, results of coagulation function tests were abnormal. Results of abdominal ultrasonography and radiography were consistent with a diagnosis of acute pancreatitis in 23 of 34 (68%) and 10 of 41 (24%) dogs, respectively. For 2 dogs, results of abdominal ultrasonography were not suggestive of acute pancreatitis, but results of abdominal radiography were.

CLINICAL IMPLICATIONS: Clinical signs and results of clinicopathologic tests are inconsistent. Abdominal ultrasonography may be valuable in the diagnostic evaluation of dogs suspected to have acute pancreatitis.

ALTERAÇÕES LABORATORIAIS

PROVET

- Hemograma:
  - Leucocitose (55%)
  - ↑ HT e ↑ Proteínas
  - Desvio a esquerda de discreto a grave (cães)
  - Anemia com trombocitopenia (Raros)
- Bioquímicos:
  - ↑ Uréia
  - ↓ Albumina e cálcio
  - ↑ ALT, Fosfatase alcalina e Bilirrubinas
  - ↑ Glicemia, colesterol e triglicérides (menos específicos)
  - Proteína C Reativa (prognóstico)

PANCREATITE EM FELINOS

PROVET

Vet Pathol 44:39–49 (2007)

Prevalence and Histopathologic Characteristics of Pancreatitis in Cats

H. E. V. De Cock, M. A. Forman, T. B. Farver, and S. L. Marks

Department of Pathology, Microbiology and Immunology (HDC), Veterinary Medical Teaching Hospital (MAF), Department of Medicine and Epidemiology (SLM), and Department of Population Health and Reproduction (TBF), University of California, Davis, CA

Abstract. Despite the high prevalence of feline pancreatic disease, no detailed description on the histopathologic nature of this disease is currently available in the literature. In this study we characterize the distribution and histopathologic changes commonly found in feline pancreases, correlate the lesions with age and gastrointestinal GI and extra-gastrointestinal disease, and compare the pancreatic lesions in cats with those in humans. The entire pancreas was removed and examined from 115 cats presented for necropsy irrespective of the cause of death. Histologic sections from left limb, right limb, and body were scored for lesions of acute (AP) and chronic pancreatitis (CP) with a scoring system based on similar systems used in human and veterinary literature. The lesions of CP in cats resemble CP in humans, with fibrosis being more prominent than inflammatory changes. Cystic degeneration gradually increased as other lesions of CP were more prominent. A distinct nodular change of zymogen depletion and acinar cell dysplasia not associated with pancreatitis was prominent in 15.6% of the pancreases. Histologically, AP consisted of neutrophilic inflammation associated with interstitial edema and necrosis of mesenteric fat.

An overall prevalence of 67%, and 45% in clinically normal animals, was identified. CP was found in 69 (60.0%) pancreases, and 58 (50.4%) had CP only, with a significant correlation between age and occurrence of CP. There was a statistically significant higher prevalence of CP in the left limb in animals with gastrointestinal disease. AP was present in 18 animals (15.7%) of which 7 animals had AP only (6.1%).

PANCREATITE EM FELINOS

- Predisposição
  - Gatos de todos os sexos, idades e raças (Siameses possuem uma maior predisposição)
  - Trauma: Contusão (queda, atropelamento, agressão)
  - Drogas: Organofosforados
  - Infecções (Toxoplasmose, PIF, herpesvirus, calicivirus)
  - Parasitas (Fígado ou pâncreas)
  - Doenças: Colangiohepatite, lipidose hepática, *diabetes mellitus,* doenças inflamatórias intestinais

PANCREATITE EM FELINOS

- Aguda
  - Anorexia
  - Desidratação
  - Letargia
  - Dor abdominal
  - Icterícia (Raro)
  - Vômitos (Raro)
- Crônica
  - Causas primárias são raramente descobertas
  - Concomitantes a outras doenças
  - Letargia, perda de peso, desidratação, perda de apetite

PANCREATITE EM FELINOS

- Alterações laboratoriais
  - Hemograma
    - Anemia não regenerativa, leucocitose ou leucopenia
  - Bioquímicos
    - ↑ das enzimas hepáticas (ALT, AST, FA)
    - ↑ Bilirrubinas
    - ↑ Uréia, glicose ou colesterol
    - ↓ Cálcio
    - ↓ Potássio

SENSIBILIDADE DE UM TESTE

Probabilidade de um teste classificar uma amostra positiva em uma amostra realmente positiva

Sens = A/ A + C

	CONDIÇÃO REAL		
RESULTADO DO TESTE	POSITIVO	NEGATIVO	TOTAL
POSITIVO	A (Verdadeiro positivo)	B (Falso positivo)	A + B
NEGATIVO	C (Falso negativo)	D (Verdadeiro negativo)	C + D
TOTAL	A + C	B + D	A+B+C+D

ESPECIFICIDADE DE UM TESTE

Probabilidade de um teste classificar uma amostra negativa em uma amostra realmente negativa

Espec = D/ B + D

	CONDIÇÃO REAL		
RESULTADO DO TESTE	POSITIVO	NEGATIVO	TOTAL
POSITIVO	A (Verdadeiro positivo)	B (Falso positivo)	A + B
NEGATIVO	C (Falso negativo)	D (Verdadeiro negativo)	C + D
TOTAL	A + C	B + D	A+B+C+D

PANCREATITE AGUDA
Diagnóstico

- Amilase
  - Pâncreas e mucosa duodenal
  - Eliminação renal (cuidado!!!!)
  - ↑ 2 a 3 X
  - Sensibilidade 62% e especificidade 57%
- Lipase
  - Igual a amilase, sendo mais limitada pelo pâncreas
  - ↑ tratamento com glicocorticóides e manipulação cirúrgica do pâncreas
  - Sensibilidade 75% e especificidade 55%

PANCREATITE AGUDA
Diagnóstico

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- Tripsinogênio (TLI) ??????
  - ↑ 100 ug/L gatos (Referência: 12 a 82 ug/L)
  - ↑ 50 ug/L cães (Referência: 5 a 35 ug/L)
  - Pode estar elevado em insuficiência renal
  - Sensibilidade 33% cães e 28% gatos
  - Especificidade 65% cães e 75% gatos

- Biópsia pancreática (histopatológico)
  - Laparotomia
  - Laparoscopia

J Vet Intern Med. 2001 Jul-Aug;15(4):329-33.

Comparison of the sensitivity of different diagnostic tests for pancreatitis in cats.

Gerhardt A, Steiner JM, Williams DA, Kramer S, Fuchs C, Janthur M, Hewicker-Trautwein M, Nolte I.

Department of Small Animal Medicine, School of Veterinary Medicine, University of Hannover, Germany. agerhard@klt.tiho-hannover.de

Abstract

The objective of this study was to compare the sensitivity of different diagnostic tests for pancreatitis in cats. Twenty-one cats with confirmed pancreatitis were evaluated at the Small Animal Clinic of the School of Veterinary Medicine in Hannover, Germany, between September 1997 and January 1999. Clinical signs of affected cats were nonspecific, with 95% of the cats showing anorexia and 86% lethargy. Also, hematologic and biochemical abnormalities of affected cats were nonspecific. Serum feline trypsin-like immunoreactivity (fTLI) in these 21 cats with pancreatitis was 127.5 +/- 109.5 microg/L (mean +/- SD; range, 24-500 microg/L). Fourteen of the 21 cats with pancreatitis had complicating conditions. Their serum fTLI was 153.9 +/- 124.3 microg/L (mean +/- SD; range, 29 500 microg/L). In this study, abdominal ultrasound showed a sensitivity for pancreatitis of 24%, and abdominal computed tomography had a sensitivity of 20%. Serum fTLI had a sensitivity between 86% when a cut-off value of 49 microg/L was used (upper limit of the control range) and 33% when a cut-off value of 100 microg/L was used. We conclude that in this group of cats with pancreatitis, measurement of serum fTLI was the most sensitive diagnostic test of those evaluated. Abdominal ultrasound, however, may be a valuable diagnostic tool in some cats with pancreatitis.

Aust Vet J. 2000 Jun;78(6):416-22.

Plasma and urinary trypsinogen activation peptide in healthy dogs, dogs with pancreatitis and dogs with other systemic diseases.

Mansfield CS, Jones BR.

Department of Small Animal Clinical Studies, Faculty of Veterinary Medicine, Ballsbridge, Dublin, Ireland.

Abstract

OBJECTIVE: To determine the specificity and sensitivity of plasma and urinary trypsinogen activation peptide (TAP) concentrations in diagnosing pancreatitis in dogs.

DESIGN: Retrospective analysis of clinical cases.

PROCEDURE: Dogs were classified into three groups: healthy animals, dogs with confirmed pancreatitis and dogs with nonpancreatic disease, which clinically or biochemically resembled pancreatitis. This last group was further subdivided into dogs with renal and those with nonrenal disease. The plasma and urinary TAP concentration was determined by a competitive enzyme immunoassay. Clinical cases additionally had serum trypsin-like immunoreactivity concentration measured, as well as radiography and ultrasound of the abdomen and further diagnostic procedures. Nonparametric analysis of variance (Kruskal-Wallis test) was performed using Statistix 4.0 program.

RESULTS: There was a wide range of urinary TAP concentration in healthy dogs (mean 52.30 nmol/L, standard deviation 55.25) that made interpretation of urinary TAP concentrations difficult in the other groups. There was a narrow reference range for plasma TAP (mean 2.67 nmol/L, standard deviation 0.93). Plasma and urinary TAP concentrations, as well as urinary TAP to creatinine ratio, were all increased in dogs that died with necrotising pancreatitis. Values were not increased in mild, interstitial pancreatitis. Increased plasma TAP concentrations were also present in dogs with severe renal disease.

CONCLUSION: Plasma TAP concentration is a good prognostic indicator in naturally occurring pancreatitis in dogs. The failure of TAP to increase in mild pancreatitis, and the increase present in severe renal disease, suggests its measurement has limited application as a sole diagnostic tool for canine pancreatitis. Further investigations are required in order to explain the large variability of urinary TAP concentration and the presence of circulating TAP in healthy dogs.

PANCREATITE AGUDA
Diagnóstico mais preciso

- Lipase específica (lipase imunorreativa ou cPLI) :
  - Spec felinos e caninos
  - Não tem influência em animais com IR
  - Radioimunoensaio (Universidade do Texas, EUA)
  - Kit idexx (ELISA) espécie específico
  - Maior custo
  - Sensibilidade 82% cães e 67% (54% brandos e 100% graves) gatos
  - Especificidade 95% cães e 91% (77% assintomáticos e 100% animais doentes) gatos

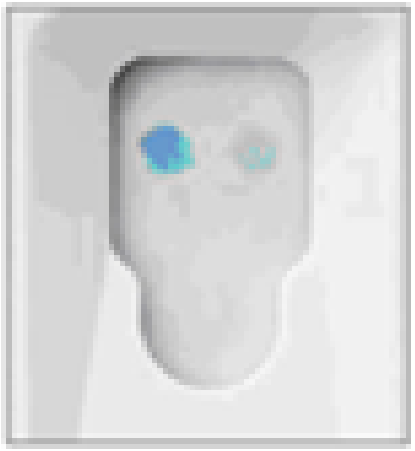
PANCREATITE AGUDA
Diagnóstico definitivo

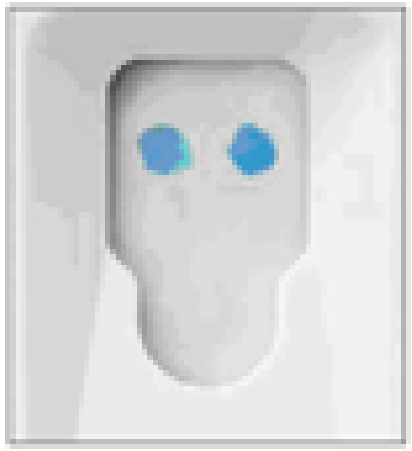
- Referência:
- Gatos
  - < 3,5 ug/L = Normal
  - 3,6 ug/L a 5,3 ug/L = Resultado alto e considerado suspeito
  - > 5,4 ug/L = Pancreatite
- Caninos
  - 200 ug/L = Normal
  - 201 ug/L a 399 ug/L = Resultado alto e considerado suspeito
  - > 400 ug/L = Pancreatite

SNAP Spec cPL o fPL IDEXX

- Disponível no Brasil
- Fácil de ser realizado
- Teste qualitativo (triagem)

SNAP Spec cPL o fPL IDEXX





Resultado Normal

Resultado Alterado

ULTRASSONOGRAFIA

- Sensibilidade e especificidade está relacionado a experiência do profissional e equipamentos utilizados.
  - Sensibilidade varia de 30% a 68% dependendo do trabalho

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J Vet Intern Med. 2004 Nov-Dec;18(6):807-15.

Evaluation of serum feline pancreatic lipase immunoreactivity and helical computed tomography versus conventional testing for the diagnosis of feline pancreatitis.

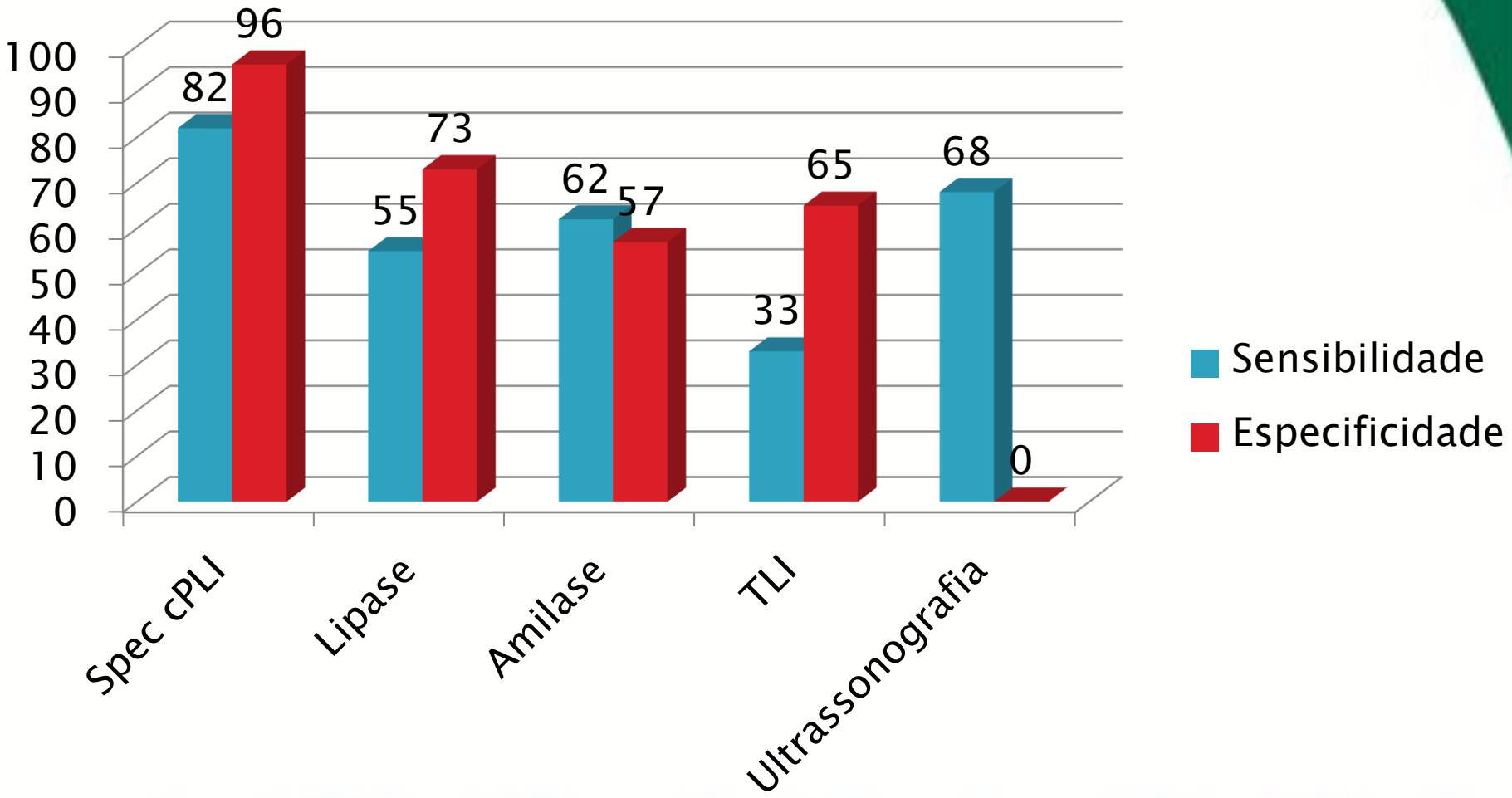
Forman MA, Marks SL, De Cock HE, Hergesell EJ, Wisner ER, Baker TW, Kass PH, Steiner JM, Williams DA.

Veterinary Medical Teaching Hospital, (Forman, Baker) University of California, Davis, School of Veterinary Medicine, Davis, CA 95616, USA.

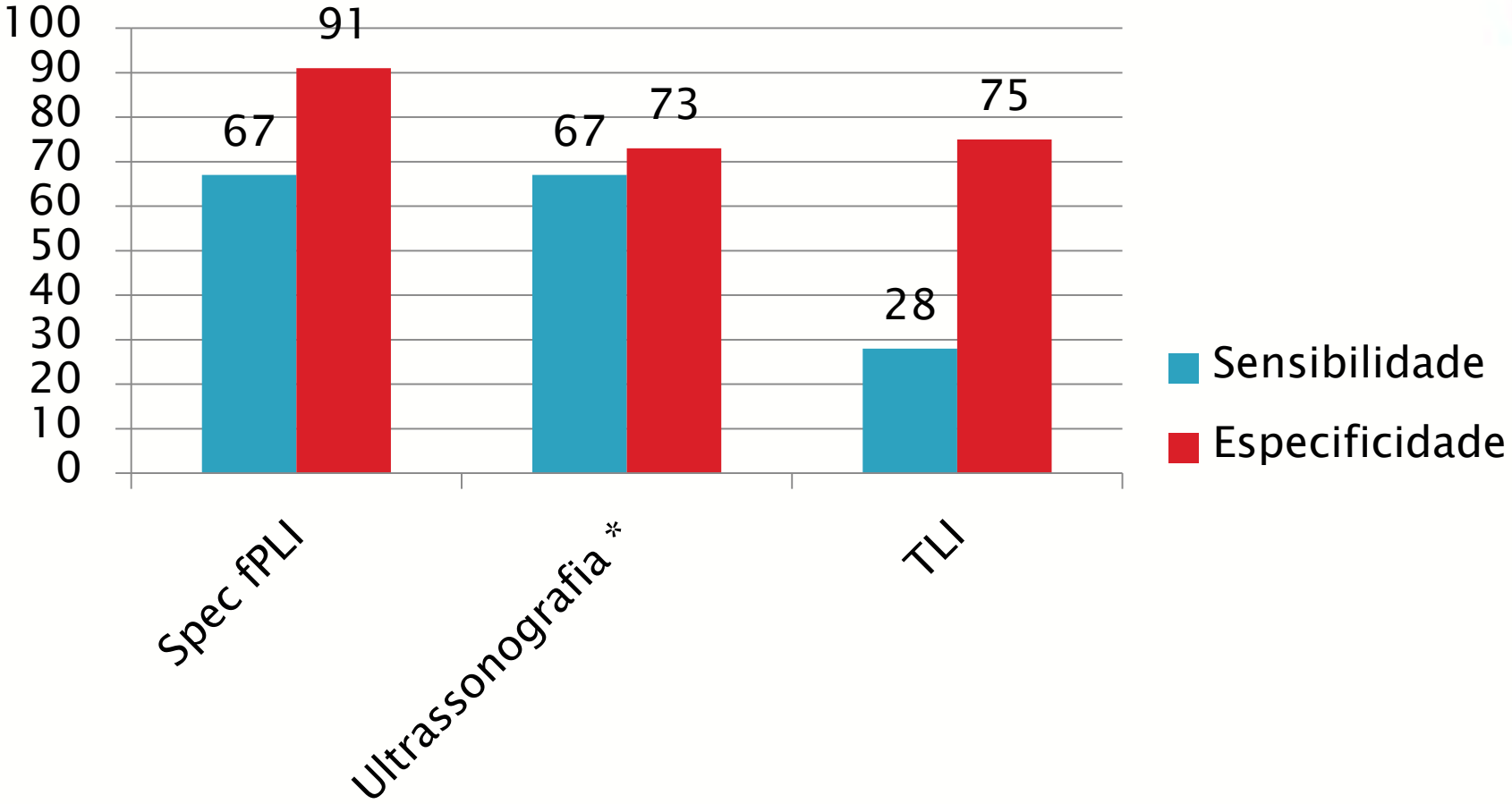
Abstract

Serum feline trypsinogen-like immunoreactivity (fTLI) concentrations and abdominal ultrasound have facilitated the noninvasive diagnosis of pancreatitis in cats, but low sensitivities (33% and 20-35%, respectively) have been reported. A radioimmunoassay has been validated to measure feline pancreatic lipase immunoreactivity (fPLI), but the assay's sensitivity and specificity have not been established. In human beings, the sensitivity of computed tomography (CT) is high (75-90%), but in a study of 10 cats, only 2 had CT changes suggestive of pancreatitis. We prospectively evaluated these diagnostic tests in cats with and without pancreatitis. In all cats, serum was obtained for fTLI and fPLI concentrations, and pancreatic ultrasound images and biopsies were acquired. Serum fPLI concentrations (P< .0001) and ultrasound findings (P = .0073) were significantly different between healthy cats and cats with pancreatitis. Serum fTLI concentrations (P = .15) and CT measurements (P = .18) were not significantly different between the groups. The sensitivity of fTLI in cats with moderate to severe pancreatitis was 80%, and the specificity in healthy cats was 75%. Feline PLI concentrations were both sensitive in cats with moderate to severe pancreatitis (100%) and specific in the healthy cats (100%). Abdominal ultrasound was both sensitive in cats with moderate to severe pancreatitis (80%) and specific in healthy cats (88%). The high sensitivities of fPLI and abdominal ultrasound suggest that these tests should play an important role in the noninvasive diagnosis of feline pancreatitis. As suggested by a previous study, pancreatic CT is not a useful diagnostic test for feline pancreatitis.

Diagnóstico em cães



Diagnóstico em gatos



* Com equipamento de boa qualidade e profissional experiente

PANCREATITE CRÔNICA

- Predisposição: gatos de pelo curto e idosos
- Episódios repetidos de pancreatite aguda
- Sinais clínicos: anorexia, perda de peso e vômitos intermitentes
- Sinais semelhantes a doença inflamatória intestinal (biópsias apenas do intestino)
- Pode desenvolver diabetes e IPE
- Diagnóstico
  - Tripsinogênio (TLI)
  - Biópsia

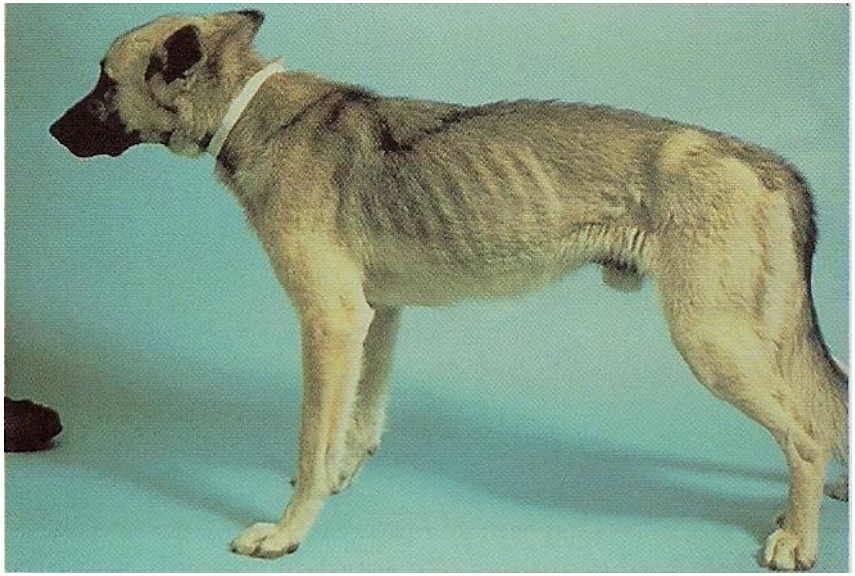
ETIOLOGIA

- Atrofia das células acinares pancreáticas (mais de 85% da capacidade)
- Repetidos episódios de pancreatites (gatos)
- Presentes em cães e raramente em gatos
- Raças: Pastor alemão (hereditário), schnauzer
- Alta proliferação bacteriana (ERA)
  - ↓ Vit B12, atrofia das vilosidades e competição pelos nutrientes
- Deficiência Vitamina K ????

Sinais clínicos

- Diarréia crônica de intestino delgado
- Polifagia
- Perda de peso crônica
- Coprofagia
- Esteatorréia ???

Animais com IPE



Fotos: Nelson & Couto, Medicina interna de pequenos animais

Aspecto das fezes

- Fezes mais volumosas
- Consistência firme a pastosa
- Presença de alimentos não digeridos
- Pode ou não haver a presença de sangue

Aspecto das fezes

Fotos: Nelson & Couto, Medicina interna de pequenos animais

Fezes de um animal com IPE

Fezes do mesmo animal após o tratamento

Exames laboratoriais

- Hemograma, perfil bioquímico e urinálise são geralmente normais
  - ALT (TGP) podem apresentar ligeiro aumento (2 a 3 X)
  - ↓ colesterol
- Teste de desafio com triglicérides com óleo de milho ??? (2 X mais)
- Testes de tripsina, amido, gordura e fibras musculares nas fezes
- Amilase e lipase não tem valor diagnóstico

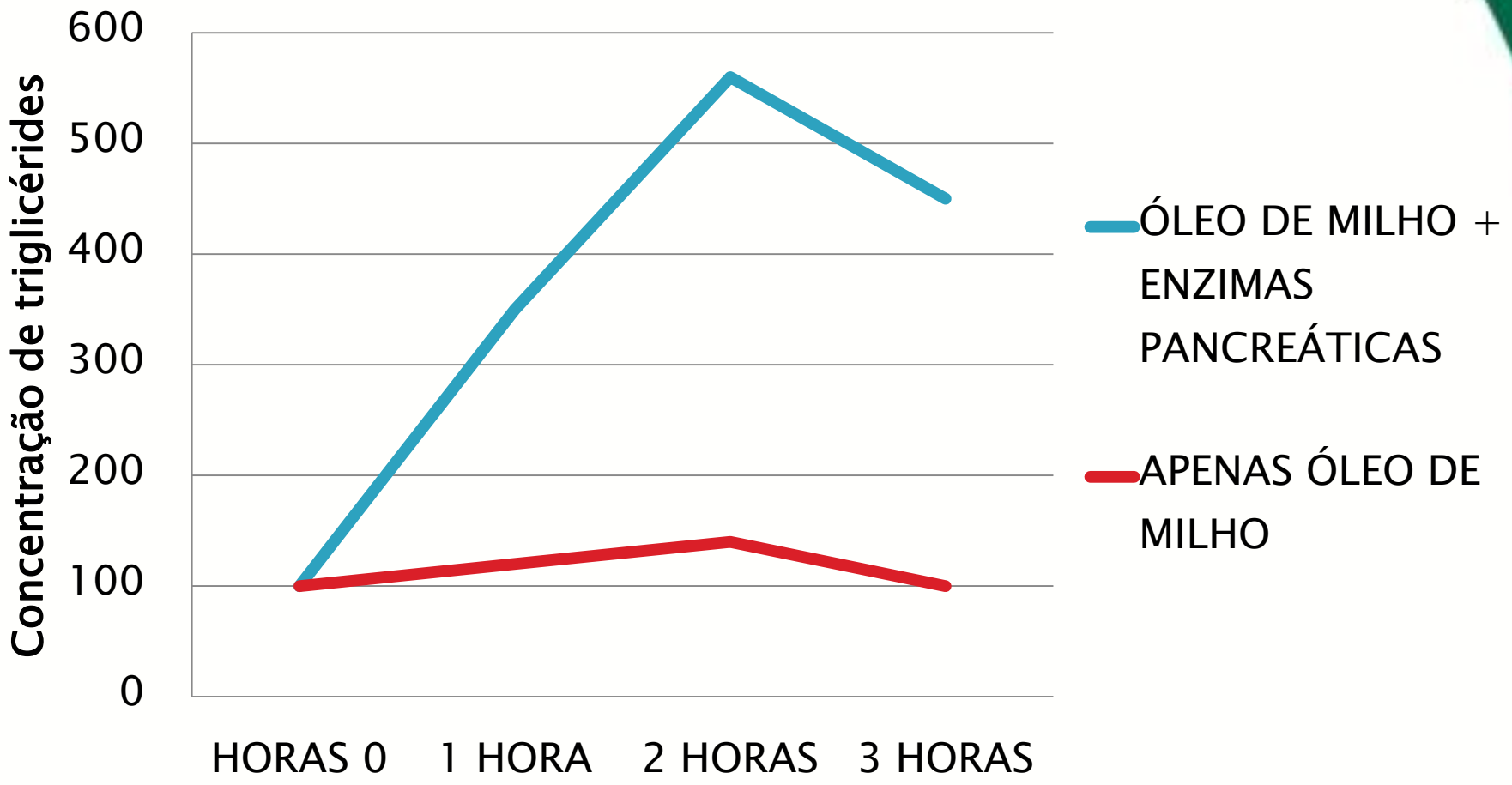
Teste de desafio com triglicérides

- Coletar amostra com 12 horas de jejum (basal)
- Administrar 3 a 4 ml/Kg de óleo de milho VO
- Coletar novamente 2 e 3 horas após
  - Mensurar triglicérides de todas as coletas
  - Normal: ↑ 2 a 3 X sobre o valor basal
  - Alterado: Sem grandes alterações nas dosagens

Teste de desafio com triglicérides

- Se der anormal repetir o teste no dia seguinte acrescentando enzimas pancreáticas (2 colheres de chá) e realizar o mesmo protocolo de coleta (Basal, 2 e 3 horas)
  - Mensurar triglicérides de todas as coletas
  - Responsiva ás enzimas: ↑ 2 a 3 X sobre o valor basal
  - Não responsiva ás enzimas: Sem grandes alterações nas dosagens (considerar doença primária de intestino delgado)

Teste de desafio com triglicérides



Exame microscópico

- Pesquisa de fibras musculares
  - Pesquisa direta em técnicas de flutuação
- Pesquisa de gordura fecal
  - Coloração com Sudam III
  - Pesquisa direta em técnicas de flutuação
- Pesquisa de amido fecal
  - Coloração com Lugol (coram-se de azul escuro a preto dependendo da quantidade)
    - Cuidado com talco de luvas de procedimentos que podem dar um falso positivo

TESTE DE TRIPSINA FECAL

- Pode ser realizado com filme de Raio-X ou solidificação da gelatina
  - Tripsina presente = Normal
- Teste com baixa sensibilidade e especificidade
- Usado como triagem: rápido, fácil realização e barato
- Clareamento do filme de Raio-X, tornando-o transparente = Tripsina presente
- Apenas o clareamento do filme = Tripsina ausente
- Não ocorre solidificação da gelatina = Tripsina presente
- Há solidificação da gelatina = Tripsina ausente

Resultados falsos positivos

- Proteases bacterianas
- Administração de pancreatina exócrina em pelo menos 3 dias antes do teste

Resultados falsos negativos

- Presença de inibidores da tripsina
- Uso completo da enzima no processo digestivo
- Obstrução pancreática dutular
  - Mensurar TLI (normal)
- Diarréias muito aquosa

Tripsinogênio (TLI)

- Teste recomendado e definitivo para insuficiência pancreática exócrina
- Espécie – específico
- Coletar após jejum de 12 horas (gatos)
- Resultados abaixo dos valores esperados
  - Cães: 5 a 35 ug/L (↓ 2,0 ug/L = IPE)
  - Gatos: 12,0 a 82,0 ug/L (↓ 8,0 ug/L = IPE)
  - Repetição dos testes de 2 a 3 meses

NEOPLASIA PANCREÁTICA EXÓCRINA

- Adenocarcinoma (raro)
- Sintomas clínicos: letargia,anorexia e perda de peso
- Sinais: pancreatite, obstrução do duto biliar extra-hepático ou IPE
- Diagnóstico:
  - Resultados laboratoriais inespecíficos
  - Ultrassonagrafia

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As vantagens de ter um animal de estimação — leia mais

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Resultados de Exames

Selecione a Unidade

OK

Instruções para Exames

Digite o procedimento

OK

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Palavra-chave

OK

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Av. Aratãs, 1009
Moema
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Unidade Divino Salvador
Av. Divino Salvador, 774
Moema

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100%

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OBRIGADO!!!!!!

- DÚVIDAS????

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