

A comparative analysis of canine pancreatic lipase tests for diagnosing pancreatitis in dogs

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Introduction

Pancreatitis is a common disorder in dogs associated with pancreatic exocrine dysfunction. Accurate diagnosis involves considering clinical history, symptoms, abdominal ultrasonography, and laboratory tests. While pancreatic biopsy is the gold standard, it is invasive and burdensome. Less invasive tests like CBC, serum biochemistry (including serum amylase, lipase, and trypsin-like immunoreactivity), and ultrasonography have low specificity for pancreatitis.

Serum canine pancreatic lipase (cPL) is a lipase of pancreatic origin that becomes elevated due to pancreatic acinar cell damage, indicating a specific biomarker for diagnosing canine pancreatitis. Common cPL assays in veterinary field include SNAP cPL (IDEXX Laboratories Inc., USA), Spec cPL (IDEXX Reference Laboratories, USA), and Vcheck cPL (Bionote Inc., Korea). SNAP cPL offers qualitative results ("normal" or "abnormal") quickly (10 minutes), while Spec cPL provides quantitative data but requires a relatively large amount of blood (1 ml of serum) and more time (2-3 days). Recently, Vcheck cPL, a new point-of-care fluorescent immunoassay, was developed. It provides quantitative results with a small sample size (25 μ L of serum) without needing to be sent to a reference lab.

Objective

The aim of this study was to evaluate the concordance and compatibility of the Vcheck cPL, SNAP cPL, and Spec cPL assays using samples from dogs with and without pancreatitis.

Methods

The study, conducted from March to September 2018, involved two groups of dogs: a control group consisting of healthy dogs and a test group presenting clinical symptoms of pancreatitis. Diagnosis in the test group was based on comprehensive evaluations, including CBC, serum chemistry, CRP levels, and ultrasonography. Subsequently, dogs in the test group were followed up at the veterinary hospital for prognosis evaluation.

Serum samples were divided into three compartments for measuring serum cPL concentrations using three assays (SNAP cPL, Spec cPL, Vcheck cPL). One was sent to a commercial lab for Spec cPL, while SNAP cPL and Vcheck cPL assays were performed in-house according to the manufacturers' instructions.

Results

Animals of the control group

All dogs in the control group (n=20) were normal in all the three cPL assays. Except for one (patient No. C-10), which showed abnormal results on the SNAP cPL test, but normal results on the Spec cPL and Vcheck cPL assays.

Diagnosis of the test group

Dogs in the test group (n=16) exhibited clinical signs, history, CBC, and serum analysis results suggestive of pancreatitis. In ultrasonography,

13 dogs showed more than one sign of pancreatitis. In contrast, 3 dogs (patient No. P-3, P-10, and P-16) had no specific signs of pancreatitis on abdominal ultrasonography. However, these dogs showed typical clinical signs of pancreatitis and had abnormal results in all cPL assays.

The final diagnosis and assignment of the test groups were performed after Spec cPL analysis. In the Spec cPL test (> 200 ng/mL), 15/16 dogs were diagnosed with pancreatitis. One dog (patient No. P-4) showed a level within the reference interval by Spec cPL, but it was finally assigned to the test group after considering its history, clinical symptoms, abdominal ultrasonography, and other data.

Correlation between the three cPL assays

The study involved 36 dogs, with SNAP cPL, Spec cPL, and Vcheck cPL assays performed at their initial visit. Control group dogs visited once, while test group dogs had multiple visits, resulting in 50 samples analyzed with the three cPL assays. Most of the 50 test results of the three cPL assays were consistent (94%), except for three samples.

There was near perfect agreement between the Spec cPL and Vcheck cPL ($k=0.960$, $p < 0.001$), SNAP cPL and Vcheck cPL ($k=0.920$, $p < 0.001$), and Spec cPL and SNAP cPL ($k=0.880$, $p < 0.001$), showing high correlations between these three cPL assays.

Spec cPL and Vcheck cPL assays uniquely provide results in quantified concentrations (ng/mL). **The correlation coefficient between these two tests was significantly high ($r=0.958$, $p < 0.001$) (Figure 1). Additionally, changes in cPL concentrations in dogs with multiple visits were consistent between Spec cPL and Vcheck cPL.**

Discussion

cPL is a crucial biomarker for diagnosing canine pancreatitis, with SNAP cPL and Spec cPL widely used in veterinary hospitals globally. Quick turnaround time, specificity, and sensitivity are vital considerations in developing cPL measurement methods due to the urgency in treating many pancreatitis cases. SNAP cPL provides rapid results in approximately 10 minutes but may be prone to reading errors due to visual interpretation. Spec cPL offers quantified results but requires sending samples to an external lab, leading to longer result wait times. Vcheck cPL provides results in quantified form within about 5 minutes from sample loading. This study compares Vcheck cPL with Spec cPL and SNAP cPL using clinical samples, focusing on their agreement and reliability. Fifty samples from 36 dogs were tested with SNAP cPL, Spec cPL, and Vcheck cPL, and most of the results were consistent, except for three. Patient No. P-4, had normal Spec cPL but abnormal Vcheck cPL and SNAP cPL. Although the Spec cPL result was in the reference range, the dog could be diagnosed as pancreatitis based on the clinical and laboratory findings including abdominal ultrasonography. Therefore, cPL test should not be used alone for the diagnosis of canine pancreatitis, and the results of ultrasound or other clinical tests should be interpreted in an integrative manner. Patient No. C-10, P-2, had abnormal results in SNAP cPL, while normal results were found in Spec cPL and Vcheck cPL. Most of the causes of this discrepancy were operational errors caused by visual reading of the SNAP cPL results; especially, near 200 ng/mL.

In this study, all cPL measurement methods showed a high degree of concordance. Particularly Spec cPL and Vcheck cPL highly correlated each other. Moreover, during therapy, the increasing or decreasing patterns of serum cPL concentration in most patients were similar in the Spec cPL and Vcheck cPL results. Therefore, Spec cPL and Vcheck cPL provided similar information for monitoring treatment and establishing a subsequent treatment strategy.

Conclusion

This study compared three serum cPL measurement assays: SNAP cPL, Spec cPL, and Vcheck cPL; moreover, these three tools demonstrated good correlations. Notably, our data illustrated that both Spec cPL and Vcheck cPL provide valuable diagnostic information for pancreatitis in dogs, making them suitable for clinical applications in veterinary hospitals.

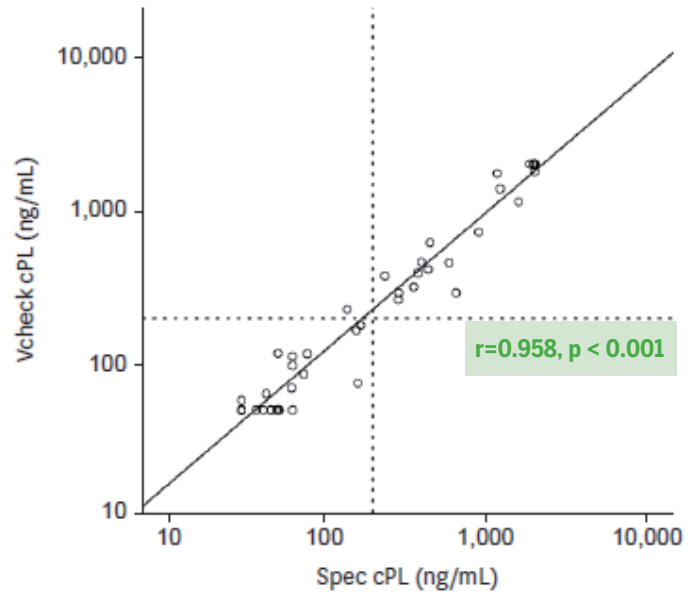


Figure 1. Comparison of the results from Spec cPL and Vcheck cPL
The dotted line represents the threshold (200 ng/mL) of the Vcheck cPL and Spec cPL. Values obtained < 30 ng/mL or < 50 ng/mL were considered as 30 and 50 ng/mL in Spec cPL and Vcheck cPL, respectively. Further, values > 2,000 ng/mL in Spec cPL and Vcheck cPL were considered as 2,000 ng/mL.

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