Novel Lipase Assay for a Rapid, Inexpensive, and Reliable Diagnosis of Pancreatitis in Dogs and Cats

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Introduction

- Pancreatitis in dogs and cats occurs commonly, but it is often underdiagnosed due to its nonspecific clinical signs, physical examination findings, and CBC and serum biochemistry results.
- Biochemical assays for lipase have been traditionally used in the diagnosis of pancreatitis. However, it is produced in multiple other tissues, including intestinal and adipose tissue and the biochemical assays have been unable to distinguish the source of the lipase.
- Immunoassays for the pancreatic specific lipase have been developed and validated for dogs (cPL) and cats (fPL) and have high sensitivity and specificity (1) for pancreatitis. However, they are expensive compared to biochemistry tests and need to be outsourced, which may take days before results are available. Frequently, values are reported as being greater than a moderate level of lipase. Alternatively, point-of-care Snap® tests may be used for rapid but qualitative or semiquantitative results.
- Recently, a biochemical lipase assay was described that has high sensitivity and specificity in dogs and cats (1-3). It uses a novel substrate (DGGR) and activators (collapse, calcine, bile acids) with high specificity for pancreatic lipase.

Methods

- A retrospective study of hospital records was made.
- All canine or feline records were retrieved for which there were determinations of lipase by both a) quantitative pancreatic immunolipase, and b) by DGGR-lipase. 67 dogs and 31 cats. Additionally, records for dogs for which point-of-care immunoassay lipase test (Snap® cPL®) and DGGR-lipase determinations had been made were retrieved. 42 dogs. Amylase data was also recovered for all these dogs and cats.
- Records from animals with clinical signs indicating a differential diagnosis of pancreatitis, including one or more of: vomiting, abdominal pain, diarrhea, weight loss, anorexia, and fever.
- DGGR and amylase assays (LI 3837 and AT 3805, Randox, UK) were performed on a Randox Immulite® biochemistry analyzer according to manufacturer’s recommendations.
- Snap-test results are qualitative, and considered to be either positive or negative. Equivocal test results were not considered.

Data Analysis

- Linear regression analysis was performed. For correlations, the Spearman’s r was calculated (GraphPad Prim 5.01, La Jolla, USA). Correlation was considered excellent (r=0.93), good (r=0.80-0.92), fair (r=0.59-0.79) or poor (r<0.59).
- ROC curves for enzymatic lipase and amylase constructed
- Normity checked with the D’Agostino & Pearson’s omnibus test

Results

- ROC Curve for Lipase >80
  - True Positive Rate (Sensitivity)
  - False Positive Rate
  - AUC = accuracy = 97%

Comparisons of Sensitivity & Specificity of DGGR-Lipase, Snap Test & Amylase at Predicting cPL Test Result

- DGGR Lipase
  - Sensitivity 93
  - Specificity 95
- Snap Test
  - Sensitivity 86
  - Specificity 85
- Amylase
  - Sensitivity 58
  - Specificity 85

Conclusions

- Snap cPL and fPL are only semi-quantitative, not giving a value for a clear positive and having lower accuracy than either the quantitative test or DGGR-lipase assay.
- DGGR Lipase is of equivalent diagnostic value as quantitative cPL and fPL.
- DGGR Lipase can be run on biochemistry analyzers found in most clinical pathology labs as opposed to outsourcing quantitative fPL or cPL giving more rapid turnaround of results.
- DGGR-lipase assay is the most cost-effective: costing us only an average of €5 per assay for reagents, whereas the quantitative PL test cost us €41 and the Snap® test cost €25.

References