

Spec cPL for Diagnosis of Canine Pancreatitis

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Exocrine pancreatic diseases are very common in dogs, and pancreatitis is the most common one. The clinical picture of dogs with pancreatitis can vary widely. Some dogs have vague clinical signs that are often not attributed to pancreatitis and others have fulminant disease with clinical signs classically associated with pancreatitis, such as vomiting and abdominal pain. Such tests as complete blood count, serum chemistry profile, and urinalysis yield nonspecific findings for pancreatitis. Abdominal radiographs may show findings compatible with a diagnosis of pancreatitis, but these changes are usually subtle and again nonspecific. Abdominal ultrasonography is specific for pancreatitis if stringent criteria are applied; however, this technique lacks sensitivity, especially in cases of mild pancreatitis not associated with pancreatic necrosis.

Serum amylase and lipase activities are neither sensitive nor specific for pancreatitis. Serum cTLI concentration is highly specific for exocrine pancreatic function but lacks sensitivity and thus is not useful for diagnosis of pancreatitis. Finally, pancreatic biopsy is highly specific for pancreatitis; however, because pancreatic inflammation is often localized, sensitivity of this test is not very high. Thus, diagnosis of pancreatitis in dogs, especially in mild cases, has proven challenging.

Pancreas-Specific Lipase & Pancreatitis

Acinar cells of the exocrine pancreas synthesize both digestive enzymes and zymogens (ie, inactive preforms) of digestive enzymes. One of the digestive enzymes being synthesized by acinar cells is classic pancreatic lipase, also simply known as pancreatic lipase. However, pancreatic acinar cells are not the only cells able to synthesize lipase, and many different lipases (ie, enzymes that digest lipids) are synthesized by different cell types in the body. All of these lipases have the same function (ie, proteolysis of lipids) and can thus potentially be detected by assays used to measure serum lipase activity. However, the different lipases secreted by the different cell types have a very different molecular structure and are thus detected by specific antibodies.



Spec cPL plate being prepared in a reference laboratory. The inset is an ELISA plate of the Spec cPL. There is a set of standards in the first two rows (wells 1 through 5), and the rest of the wells are loaded with clinical samples. Some samples clearly show intense color, indicating that serum concentration of pancreatic lipase is high and that pancreatitis is likely in that particular patient.

Most pancreatic lipase synthesized by pancreatic acinar cells, along with other enzymes and zymogens, is secreted by way of exocytosis into the duct system of the pancreas, ultimately reaching the duodenum, where they are needed to digest dietary components. However, a small amount of pancreatic lipase is released into the vascular space.

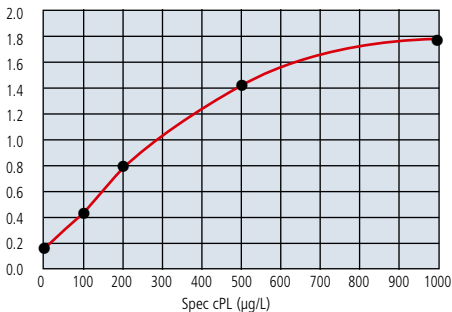
The Spec cPL (IDEXX Laboratories) is an immunoassay that exclusively measures the concentration of pancreatic lipase in serum (**Figure 1**). In healthy individuals, only a small amount of pancreatic lipase is released into the vascular space (Spec cPL reference range, <400 µg/L). However, when the pancreas is inflamed or necrotic, an increased amount of pancreatic lipase leaks into the vascular space. Therefore, serum pancreatic lipase concentration is increased in dogs with pancreatitis.

Currently, the suggested cut-off value for Spec cPL considered diagnostic for canine pancreatitis is 400 µg/L. It is important to note that the degree of elevation does not necessarily reflect the severity of the disease process. However, in the same patient, repeated measurement of serum Spec cPL can be used to assess progression of the disease process. In patients with

cPL = canine pancreatic lipase; cTLI = canine trypsin-like immunoreactivity

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1. Sample Standard Curve of Spec cPL Assay



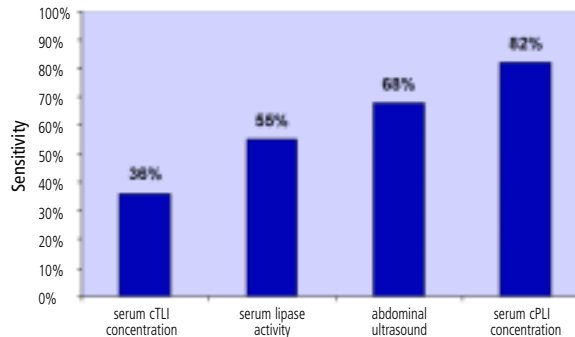
Samples from clinical patients are compared with this standard to determine serum pancreatic lipase concentration.

acute severe pancreatitis, repeated measurement of Spec cPL every 2 to 4 days may be useful, whereas in patients with chronic mild disease, repeated measurement every few weeks is more appropriate.

Indications

The most common signs observed in dogs with severe pancreatitis are anorexia, vomiting, dehydration, abdominal pain, and diarrhea. Thus, pancreatitis should be included on the list of differential diagnoses in any dog presenting with these signs, and unless there is some other obvious cause of the signs, serum Spec cPL should be measured. Because the source of vague clinical signs, such as intermittent anorexia, lethargy, and change in activity or personality, cannot readily be identified, serum Spec cPL measurement should also be considered in the absence of classic signs of pancreatitis. In addition, miniature schnauzers are believed to be at increased risk for pancreatitis and should have serum pancreatic lipase concentrations measured when they have vague clinical signs that may be indicative of pancreatitis. Finally, dogs with risk factors for pancreatitis and compatible clinical signs should also be evaluated. Such patients include those treated with L-asparaginase, potassium bromide, phenobarbital, vincristine, vinblastine, azathioprine, estrogen, and calcium;* patients that have undergone laparotomy or another anesthetic procedure; and those that have suffered blunt trauma.

2. Sensitivity of Methods for Diagnosing Canine Pancreatitis



Note that serum canine trypsin-like immunoreactivity concentration, abdominal ultrasonography, and serum canine pancreatic lipase immunoreactivity (cPLI) concentration are highly specific for canine pancreatitis, while only approximately 50% of dogs with elevated serum lipase activity actually have pancreatitis. Note that the serum cPLI is the original assay for the measurement of pancreatic lipase concentration that has since been replaced by a commercial assay for the measurement of pancreatic lipase, Spec cPL.

Advantages of the Spec cPL

Pancreatic lipase is specific to the pancreas. Therefore, elevated concentrations of serum pancreatic lipase can only originate from the pancreas, resulting in very high specificity of the test for exocrine pancreatic disease. This high specificity is in sharp contrast to the low specificity of serum lipase activity, which estimates the enzymatic activity of lipases regardless of cellular origin. Serum amylase and lipase activities have traditionally been used to diagnose pancreatitis in dogs. However, it has been suggested that about 50% of dogs with pancreatic inflammation will have normal serum amylase and lipase activities and that about 50% of dogs with elevated activities of one or both of these enzymes do not have pancreatitis. This lack of specificity is due to the fact that synthesis and secretion of both amylases and lipases are not limited to the exocrine pancreas.

Measurement of the serum concentration of pancreatic lipase by Spec cPL is highly sensitive for pancreatitis. In a recent study, serum cPLI concentration (the original assay for the measurement of pancreatic lipase that has since been replaced by the commercial version of the assay,

serum Spec cPL) was the most sensitive diagnostic test for canine pancreatitis (Figure 2) when compared with serum lipase activity, serum cTLI concentration, and abdominal ultrasonography.

Disadvantages

Thus far, no known disadvantages have surfaced for this new diagnostic test. However, more studies will be necessary to confirm these initial findings. Also, experience with this assay under everyday clinical conditions will help better define its overall clinical usefulness. Currently, the Spec cPL can only be used by a reference laboratory and has a turnaround time of approximately 12 to 24 hours. Thus, an in-house assay with immediate results would be beneficial for management of severely ill dogs suspected of having pancreatitis.

Costs

As a stand-alone test, each test currently costs about \$30 from IDEXX laboratories; however, several panels that incorporate the serum Spec cPL along with other parameters are available, which decreases the cost for the Spec cPL. ■

See Aids & Resources, back page, for references, contacts, and appendices.

* Administration of calcium is a model of experimental pancreatitis. Thus, an animal with suggestive clinical signs and an elevated serum calcium concentration should be evaluated for the disease.

cTLI = canine trypsin-like immunoreactivity