Importance of cPLI Evaluation of Potential Pancreatitis in Small Animal Practice

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General

The exocrine pancreas' primary function is to secrete digestive enzymes, bicarbonate and intrinsic factor.[1] These enzymes are responsible for the initial digestion of nutrients. Additionally, electrolytes and antibacterial proteins are released in the pancreatic juice.[2] Proteases (trypsin, chymotrypsin), lipase, amylase, colipase, non-specific esterase, elastase, carboxypeptidase and phospholipase A2 are a few of the enzymes which are released and assist in digestion. Pancreatic secretions occur through a complex system of neural, humoral and paracrine mediators.[3]

Physiology

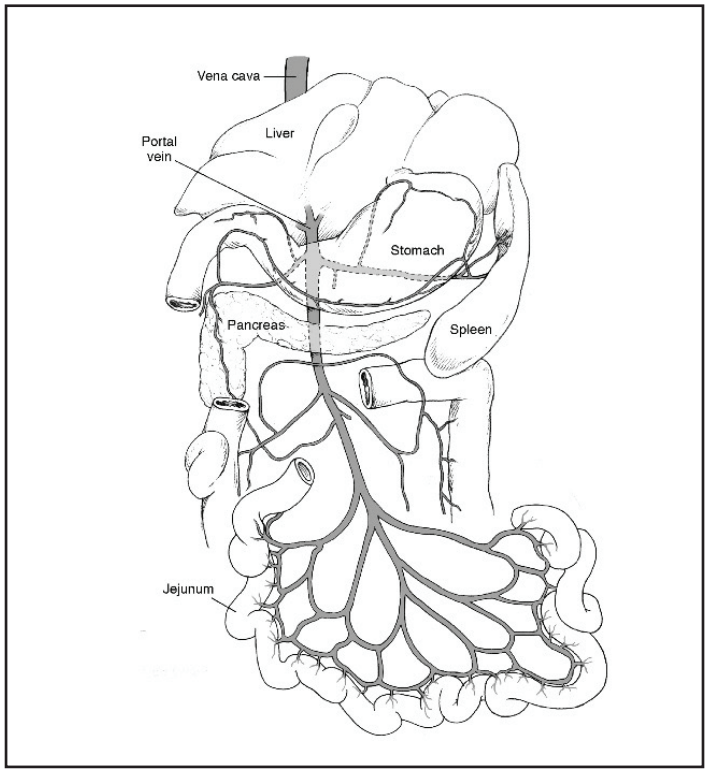
Pancreatitis or inflammation of the pancreas occurs secondary to over-activation of trypsin and other pancreatic proteases, overwhelming the safeguards such as trypsin inhibitor and other cellular mechanisms of protection.
Different forms of pancreatitis are recognized: acute, recurrent and chronic. Acute and recurrent pancreatitis occur suddenly with varying severity. Some cases are mild and respond without intervention, others are severe with systemic involvement including but not limited to development of systemic inflammatory response syndrome, pancreatic necrosis, multiple organ dysfunction/failure and death.[4]

Incidence and Etiology of Pancreatitis

The exact incidence of clinical pancreatitis is unknown. Reports describing histologic changes identified during necropsy range from 1.3 to 1.5% in dogs and cats respectively.[5] Numerous studies have evaluated causes of pancreatitis: certain drugs such as potassium bromide, asparaginase, prednisone, phenobarbital and azathioprine have been implicated, just to name a few. Risk factors associated with pancreatitis include obesity, hyperadrenocorticism, hypothyroidism, and diabetes mellitus.[6] Other risk factors and causes reported included dietary indiscretion, diets high in fat, reperfusion/ischemic injury from surgery or trauma, hypercalcemia and infections such as toxoplasmosis.[7] Most cases of pancreatitis are idiopathic and most affected dogs are small breeds, such as terriers.

Diagnostic Laboratory Testing

Clinical diagnostics for acute and chronic pancreatitis have always focused on the symptoms and effects of systemic disease rather than the detection of pancreatic inflammation. It becomes extremely important to evaluate the patient



for all forms of pancreatitis; mild chronic pancreatitis can develop acute manifestations of the disease, diabetes mellitus, and exocrine pancreatic insufficiency. Serum amylase and lipase have often been used to help diagnose the pancreatic patient. However, it has been shown that the amylase activity in many dogs that have acute pancreatitis is normal, and further amylase is also produced by other organs, thus making the measurement of amylase of little diagnostic value. There are also many types of lipase produced from the body in different forms (i.e. gastric lipase, pancreatic lipase, hepatic lipase). Although there are now tests that help identify different forms of lipase, studies still do not agree on the overall specificity for the diagnosis of pancreatitis. Ultrasound examination is a very strong tool for diagnosis of pancreatitis. However, the sensitivity of ultrasound is dependent on equipment resolution, operator skills, suspicion of the ultrasonographer, and the severity of disease.[8]

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Diagnostic Laboratory Testing *continued*

Canine pancreatic lipase immunoreactivity (cPLI) is now available for specific detection of pancreatic lipase. Elevations of cPLI are directly dependent on the severity of disease; however studies have shown that the cPLI testing has an 80% specificity in patients with acute pancreatitis, while it has a 60% specificity in patients with mild pancreatitis making this test the most sensitive indicator of pancreatitis available. Up to this point there have been in hospital point of care screening tests that could be used to help rule out pancreatitis in the ill patient; however it has been recommended that positive patients also have a quantitative test that must be submitted to a send-out laboratory for diagnostic confirmation, a baseline for the disease, and a response to treatment.[9]

Clinical Studies and Interpretation

Table 1

	> 200 µg/L		> 400 µg/L	
	PPV	NPV	PPV	NPV
VetScan® cPL Rapid Test	54%	100%	75%	95%
TAMU cPL	47%	100%	70%	100%
ANTECH® Precision PSL™	50%	100%	60%	93%
IDEXX SNAP® cPL	54%	100%	N/A	N/A

Per SNAP cPL Product Insert, test is either "normal" or "abnormal". For the purposes of this trial, assume "abnormal" test result > 200 µg/L.

Positive Predictive Value (PPV): likelihood pet has illness

Negative Predictive Value (NPV): likelihood pet does not have illness

Initial clinical evaluations of the VetScan® cPL correlate well with the other testing methodologies for pancreas-specific lipase in dogs. In a clinical study of dogs suspected of having pancreatitis, the VetScan cPL was tested against three other commercially available tests with the VetScan cPL being the only truly semi-quantitative point of care canine pancreatic lipase assay that provides a numeric value. Table 1 shows the positive (PPV) and negative predictive values (NPV) of the four tests in a clinical study of dogs with and without pancreatitis based on signalment, signs, physical examination, and diagnostics including an abdominal ultrasound examination by a boarded radiologist at the point of admission.

Based on this study, all four tests performed in a similar fashion. However, because the Vetscan cPL provides the semi-quantitative numerical value, the information provided is immediate and does not require additional reference laboratory testing. If you suspect your patient has pancreatitis but the VetScan cPL gives a value of less than 200 µg/L, it is highly likely that your patient has a disease other than pancreatitis and because of the immediate result, you can then look for other causes of disease and not have to wait days later for a send out quantitative test result. If the VetScan cPL (or other) test result is between 200 and 400 µg/L, there is a little more than a 50% chance that your patient does have pancreatitis.

If the result is greater than 400 µg/L, there is a 75% chance of pancreatitis being the cause for the elevated cPL value. Due to the semi-quantitative value provided, the VetScan cPL can be used to monitor disease progression while the patient is in your hospital.

In summary, a dog suspected of having pancreatitis who tests with a normal (<200 µg/L) cPL level on the VetScan cPL Rapid Test most likely does not have pancreatitis and it is suggested to consider other disease processes. If a dog is suspected of having pancreatitis and the VetScan cPL value is between 200 and 400 µg/L, there is a better than 50% probability that is the correct diagnosis; if the result is greater than 400 µg/L, a pancreatitis diagnosis is even more likely.

This cost effective point of care test avoids the burden of both time and financial cost associated with send-out testing, providing efficient and economical diagnosis, monitoring of efficacy of therapy, and monitoring of chronic pancreatitis patients.

Citations:

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[6]Hess RS , Kass PH , Shofer FS , et al. Evaluation of risk factors for fatal acute pancreatitis in dogs. J Am Vet Med Assoc 1999;214:46–51.

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[8]Ettinger, S, Fladman, E, and Cote, E. Textbook of Veterinary Internal Medicine 8th Edition. Elsevier, Canada, 2017, p 1683.

[9]Ettinger, S, Fladman, E, and Cote, E. Textbook of Veterinary Internal Medicine 8th Edition. Elsevier, Canada, 2017, p 1684-1685.