IDEXX LABORATORIES

DIAGNOSTIC UPDATE

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IDEXX Laboratories Introduces the SNAP® fPL™ Test

Pancreatitis, an inflammatory condition of the exocrine pancreas, is a multifactorial disease in cats with a variable clinical course and outcome. Feline pancreatitis is more common than many practitioners realize and diagnosis of this elusive disease can be extremely challenging.

Recognizing these challenges, Dr. Jörg Steiner and Dr. David Williams developed and validated the feline pancreatic lipase immunoreactivity (fPLI) assay for the diagnosis of pancreatitis at the Gastrointestinal Laboratory at Texas A&M University. The fPLI test has been shown to be both sensitive for detecting significant pancreatitis and specific for helping to rule out pancreatitis.

Previously, IDEXX had collaborated with Drs. Steiner and Williams to develop the quantitative Spec fPL® Test (feline pancreas-specific lipase test), available through IDEXX Reference Laboratories network, to assist in the diagnosis of pancreatitis in cats. The acceptance of this test has been overwhelmingly positive. The most frequent question asked of IDEXX has been "when will a SNAP® version be available?"

In response to these inquiries, IDEXX has continued to work with Drs. Steiner and Williams to develop the SNAP® fPL™ (feline pancreas-specific lipase) Test. The pet-side SNAP fPL Test uses the same monoclonal antibody and recombinant antigen technology as used in the laboratory Spec fPL Test.

Prevalence of Pancreatitis in Cats

A 2007 study published in the *Journal of Veterinary Pathology* found 67% of cats presented for necropsy, irrespective of the cause of death, had histologic evidence of pancreatitis, including 45% in apparently healthy cats. Chronic pancreatitis was more common than acute pancreatitis (60% versus 15.7%).[1]

Although the prevalence of clinically significant pancreatitis is likely not this high, these findings suggest that pancreatic inflammation likely occurs with a wide variety of clinical conditions and potentially explains why mild pancreatic lesions are common even in clinically healthy animals.[1]

Cats with other common ailments, including diabetes mellitus, inflammatory bowel disease, cholangitis and hepatic lipidosis, often have concurrent pancreatitis that is usually overlooked.[2–5]

Clinical Signs

Cats with pancreatitis typically present with nonspecific signs of illness including lethargy, decreased appetite, dehydration and weight loss.[6] Vomiting and abdominal pain are hallmarks of this disease in dogs, but in cats, vomiting may be absent or intermittent and abdominal pain is rarely recognized. Diarrhea can be associated with pancreatitis or secondary to concurrent gastrointestinal disease. Icterus, fever and a palpable abdominal mass may be found on physical examination.

Laboratory Findings

Routine laboratory findings in cats with pancreatitis may be normal, nonspecific or attributed to concurrent conditions which are common in this species. CBC changes most commonly seen in cats with pancreatitis are nonregenerative anemia, leukocytosis and leukopenia.[6] Increased liver enzymes, hyperbilirubinemia, hyperglycemia, azotemia, electrolyte imbalances and hypocalcemia can be seen on a complete biochemical profile.[6] Serum activities of amylase and lipase are not helpful in diagnosing pancreatitis in cats.[7]

Serum trypsin-like immunoreactivity (TLI) concentration is specific for exocrine pancreatic function and is the test of choice for diagnosing exocrine pancreatic insufficiency in cats. However, in cats with clinical signs of pancreatitis, serum fTLI concentration has been shown to be poorly associated with histopathologic diagnosis and overall sensitivity of 28% and specificity of 75% for the diagnosis of pancreatitis.[8,9]

Diagnostic Imaging

Radiographs are an important diagnostic tool when evaluating sick cats, especially if they present vomiting. In cats with pancreatitis, abdominal radiographs may show a loss of detail in the cranial abdomen, shifting of abdominal organs and, in some cases, suggestion of a mass in the cranial abdomen. However, these findings are rather subjective, and a conclusive diagnosis of pancreatitis is not possible by abdominal radiography alone.

Abdominal ultrasonography is also a valuable tool when evaluating sick cats for evidence of pancreatitis. In addition, ultrasound allows evaluation of other organs. This is important because it is common for cats with pancreatitis to have liver and/or intestinal disease concurrently. As technology has improved, it is no longer sufficient just to visualize the pancreas or an enlarged pancreas to diagnose pancreatitis on ultrasound. Changes in pancreatic parenchymal echogenicity, evidence of peripancreatic fat necrosis and fluid accumulation are supportive of pancreatitis. Recent studies have shown ultrasound to be 24%–67% sensitive and 73% specific for the diagnosis of pancreatitis.[5,8]

Pancreatitis in Dogs versus Cats

	CANINE	FELINE
Classic Signalment	**Age:** Middle-aged to older **Sex:** Male or Female **Breeds predisposed:** Schnauzers, Yorkshire terriers, poodles	**Age:** Middle-aged to older **Sex:** Male or female **Breeds predisposed:** Possibly Siamese
Weight	Often obese	Often underweight or history of weight loss
Prevalence	1.0% of 9,342 dogs on necropsy[11] >90% of cases undiagnosed (results on recent necropsy study)[12]	0.6% of 6,504 cats on necropsy[11] 67% of cats presented for necropsy (45% of healthy cats)[1]
Risk Factors	**Drugs:** Potassium bromide, azathioprine, furosemide, tetracycline, aspirin, sulfa drugs, L-Asparaginase, zinc toxicosis **Diet:** High-fat foods; dietary indiscretion **Hyperlipidemia** (e.g., familial in miniature schnauzers) **Hypercalcemia** **Hypothyroidism** **Hyperadrenocorticism** **Blunt trauma**	**Drugs:** Organophosphates **Infectious causes:** *Toxoplasma gondii*, pancreatic fluke *(Eurytrema procyonis)*, liver fluke *(Amphimerus pseudofelineus)*; Viral—FIP, herpesvirus, VS-calicivirus **Diet:** High-fat foods not implicated in cats **Hypertriglyceridemia** **Hypercalcemia** **Blunt trauma**
Common Concurrent Diseases	Familial hyperlipidemia in miniature schnauzers	Hepatic lipidosis Cholangitis Inflammatory bowel disease Diabetes mellitus
Clinical Signs*	Anorexia Vomiting Weakness Abdominal pain Dehydration Diarrhea	Lethargy Anorexia/decreased appetite Dehydration Weight loss Icterus Vomiting Fever Abdominal pain Diarrhea Palpable abdominal mass
CBC*	Thrombocytopenia Neutrophilia with left shift Anemia	Nonregenerative anemia Leukocytosis Leukopenia
Chemistry Profile*	Increased liver enzymes Azotemia Electrolyte imbalances Hyperbilirubinemia Hypoalbuminemia Hypercholesterolemia Hypoglycemia Hyperglycemia	Increased liver enzymes Hyperbilirubinemia Hyperglycemia Azotemia Electrolyte imbalances Hypocalcemia
Amylase and Lipase	55% sensitive[13] Specific if 2–3 times above the upper limit of the reference interval Trending increases utility	Not shown to be useful[7]
Radiographs	Nonspecific Identify obstruction, radiodense foreign bodies, etc.	Nonspecific Identify obstruction, identify radiodense and suspect linear foreign bodies, etc.
Abdominal Ultrasound	Up to 68% sensitive[14] High specificity with experienced ultrasonographer	24%–67% sensitive[5,9] 73% specific[5]
TLI	33% sensitive[13] 65% specific[13]	28% sensitive[5] 75% specific[5]
Pancreas-Specific Lipases **Spec cPL®/SNAP® cPL™** **Spec fPL®/SNAP® fPL™**	93% sensitive[15] 78% specific[15]	79% sensitive[10] 80% specific[10]
Treatment	**Fluids & Electrolytes:** Rehydration, pancreas perfusion, correct electrolyte and acid-base imbalances **Analgesics:** Routinely administer **Antiemetics:** Control vomiting to allow nutritional support **Nutritional support:** NPO no longer recommended; low-fat food per os or via feeding tube **Plasma:** Provide clotting factors, antiproteases, α-macroglobulins **Colloids:** Improve oncotic pressure to enhance pancreatic perfusion **Antacids:** If evidence of gastrointestinal bleeding **Antibiotics:** Rarely indicated	**Fluids & Electrolytes:** Rehydration, pancreas perfusion, correct electrolyte and acid-base imbalances **Analgesics:** Routinely administer **Antiemetics:** Control vomiting to allow nutritional support **Nutritional support:** NPO not recommended; fat content not important; feeding tube usually required **Plasma:** Provide clotting factors, antiproteases, α-macroglobulins **Colloids:** Improve oncotic pressure to enhance pancreatic perfusion **Antacids:** If evidence of gastrointestinal bleeding **Antibiotics:** Rarely indicated **Cobalamin (vitamin B_{12}):** Deficiency common with concurrent gastrointestinal disease **Glucocorticoids:** Believed to be beneficial especially in chronic disease; not contraindicated to treat concurrent disorders **Appetite stimulants** **Treat concurrent diseases** (e.g., insulin for diabetes)

*Listed in order from most to least frequent findings. For canine clinical signs, CBC and chemistry profile, see reference 14.
For feline clinical signs, CBC and chemistry profile, see reference 6.

See page 4 for references.

Clinical Utility of the SNAP® fPL™ Test

Diagnosis

In a recent study, the Spec fPL® Test had a sensitivity of 79% for diagnosing pancreatitis in cats and a specificity of 80% for ruling out pancreatitis.[10]

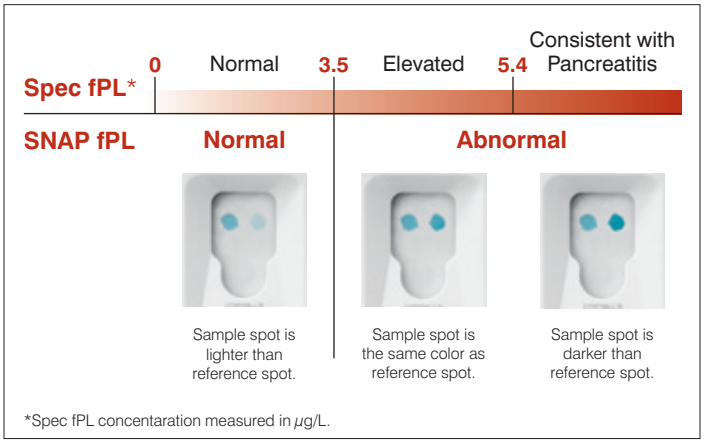
The SNAP fPL Test is a pet-side version of the Spec fPL Test that uses IDEXX SNAP® ELISA technology. The SNAP fPL Test is part of a growing family of IDEXX SNAP tests used by thousands of veterinarians worldwide.

The SNAP fPL Test uses the same assay reagents as the Spec fPL Test and was designed to align with the Spec fPL Test but displays results in 10 minutes. In fact, an analysis of 500 cats reveals that the SNAP fPL Test has a 92% agreement with the Spec fPL Test for the identification of normal patients (≤3.5 µg/L), 82% agreement for identification of abnormal patients (>3.5 µg/L) and a 96% agreement for identification of patients with levels consistent with pancreatitis (≥5.4 µg/L).[16]

The SNAP fPL Test has been optimized to be a sensitive screening test for pancreatitis and, therefore, provides abnormal results for any sample above the Spec fPL Test's reference range of 3.5 µg/L.

The test result is displayed as a colored sample spot that must be compared to the reference spot. If the color intensity of the sample spot is lighter than the color intensity of the reference spot, then the SNAP fPL concentration is normal. If the color intensity of the sample spot is equal to or darker than the reference spot, then the SNAP fPL concentration is abnormal.

IDEXX Reference Laboratories' Spec fPL Concentration Compared to SNAP fPL Results



*Spec fPL concentaration measured in µg/L.

Concurrent conditions

As previously noted, it is very common for cats with pancreatitis to have other concurrent conditions.[2–5] The term "triaditis" has been used to describe the complex of cholangitis, inflammatory bowel disease and pancreatitis. Hepatic lipidosis and pancreatitis commonly occur together. Chronic pancreatitis is identified at necropsy in approximately 50% of diabetic cats.[2] Therefore, it is recommended that a Spec fPL test be performed in cats with liver and/or intestinal disease and in newly diagnosed and hard to regulate diabetic cats.[2] Similarly, a serum cobalamin (vitamin B_{12}) concentration should be performed in cats with pancreatitis to look for evidence of intestinal disease.

Monitoring

Because of the sensitivity for pancreatic inflammation and the tight precision of the assay, Spec fPL concentrations may be helpful for monitoring cats with pancreatitis. In cats with acute pancreatitis, it may be useful to evaluate the Spec fPL concentration every few days during hospitalization and at recheck visits. In cats with chronic pancreatitis, monitoring the Spec fPL concentration to assess the response to treatment or management changes (e.g., introduction of corticosteroid therapy) may be valuable.

Prognosis

The prognosis for cats with pancreatitis is directly related to the severity of the disease. Patients with mild chronic pancreatitis may do well long-term but may also develop intermittent episodes of severe disease. Patients with acute, severe disease, especially if systemic complications are present, have a poor prognosis. Pancreatitis may complicate management of concurrent diseases, such as diabetes mellitus, in cats. It also has been shown that cats with concurrent acute pancreatitis and hepatic lipidosis have a poorer prognosis than cats with hepatic lipidosis alone.[3] Therefore, diagnosis and management of the pancreatitis may be critical to the successful management of these other conditions.

For more information about feline pancreatitis diagnosis and treatment, go to idexx.com/felinepancreatitis.

Learn More About the SNAP fPL Test as a Diagnostic Tool for Your Practice

If you have any questions regarding the SNAP fPL Test or how to interpret test results, please call our team of internal medicine specialists at 1-888-433-9987. To order, contact your authorized IDEXX distributor or call 1-800-355-2896.

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The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment, you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical presentation and complete laboratory data. With respect to any drug therapy or monitoring program, you should refer to product inserts for a complete description of dosages, indications, interactions and cautions.

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