# **Diagnosing and Treating Feline Pancreatitis: A Continuing Challenge**

Frédéric P. Gaschen, DVM, DACVIM

# Louisiana State University

Baton Rouge, LA

The prevalence of pancreatitis among cats presented to veterinarians is not negligible. Since the early nineties the disease has been the object of much clinical research. However, despite these many years of research and accumulated experience, the diagnosis of feline pancreatitis, especially in its chronic form, remains a major challenge today. Moreover, there is no consensus on the best therapeutic approach. These facts contribute to an ongoing frustration when dealing with suspect cases.

### Objectives

- To review the various forms of feline pancreatitis and their clinical presentation
- To propose a diagnostic approach for cats with suspect pancreatitis
- To present current concepts for treatment of cats with pancreatitis

# Pancreatic inflammation in the cat

Acute necrotizing pancreatitis (ANP) is the most common form of acute pancreatic inflammation. Its histopathologic features are dominated by glandular necrosis and necrosis of peripancreatic fat. ANP is associated with an important morbidity and mortality. Acute suppurative pancreatitis (ASP) is characterized by neutrophilic infiltration of the pancreas, some degree of necrosis may be present as well. ASP seems to affect younger cats and is less common that ANP. Lymphocytic inflammation, fibrosis and acinar atrophy are the typical histopathologic features of chronic non-suppurative pancreatitis. However, the clinical features of ANP and chronic pancreatitis cannot be differentiated, and only histopathology allows distinguishing the two types of pancreatic inflammation. Chronic pancreatitis has been hypothesized to result from ANP although this concept has not been confirmed to date. It often has a recurring clinical course that can eventually lead to exocrine pancreatic insufficiency.

### Prevalence

Based on 2 studies identifying inflammatory lesions affecting the pancreas in necropsied cats, the prevalence of feline pancreatitis is between 1.3 and 3.5% in cats undergoing necropsy, which makes it a relatively common disease. In addition, 67% of cats autopsied in a recent study showed histological lesions in the pancreas. The prevalence of lesions of pancreatitis among apparently healthy cats reached 45%. More than half of necropsied cats had chronic changes whereas acute lesions represented only 6.1%. Some animals displayed simultaneous acute and chronic lesions. These data underscore the importance of chronic pancreatitis in the feline population, although most cases seem to remain clinically unnoticed.

# Etiology

The natural causes of feline pancreatitis remain mysterious in most instances, although several associations have been described (Table 1). They include trauma and associated ischemia (high rise syndrome, traffic accident), viral (FIP and FIV) or parasitic infections (Toxoplasma gondii, liver and pancreatic flukes), and intoxication with organophosphates. These associations are probably only responsible for an very small proportion of clinical cases. However, treatment of an existing underlying process may be enough to successfully treat pancreatitis.

Cats with pancreatitis may also be affected with concomitant inflammatory bowel disease (IBD) and cholangiohepatitis. This is attributed to the peculiar anatomy of the pancreatic and bile ducts in felines that often merge together before reaching the duodenal papilla. As a result, the feline pancreas is exposed to an increased risk of bile reflux or ascending infection. The term "triaditis" describes the simultaneous presence of IBD, cholangiohepatitis and pancreatitis in the cat.

Concomitant diseases			
• biliary tract disease (cholangitis, obstruction)			
• cholangiohepatitis			
• IBD			
Infections			
<ul> <li>toxoplasmosis</li> </ul>			
• feline infectious peritonitis (FIP)			
• Liver or pancreatic flukes			
• Viral infections with calicivirus, herpes, panleukopenia, FIV			
Metabolic factors			
Hypertriglyceridemia			
Hypercalcemia			
Drugs, toxins			
• Organophosphates (e.g. topical fenthion application)			
Trauma			
Abdominal or pancreatic surgery			
Vehicular accident			
High rise syndrome			
Miscellaneous			
• Hypotension (shock, anesthesia) causing pancreatic ischemia			
• Pancreatic duct obstruction (neoplasia)			

#### **Clinical signs**

Unlike what is seen in dogs and humans, cats with pancreatitis are frequently presented with vague clinical signs (Table 2). These include lethargy, decreased appetite, possibly with gradual onset of weight loss. Dehydration and hypothermia may also be present. Tachypnea, abdominal pain, vomiting, diarrhea and abdominal masses are less frequently reported.

Based on the non-specific clinical picture, a wide group of diseases needs to be considered in the differential diagnosis of feline pancreatitis. In middle-aged to older cats, these include (but are not limited to) chronic kidney disease, liver disease, inflammatory bowel disease (IBD), alimentary lymphoma and other neoplasias, feline infectious peritonitis (FIP), and endocrinopathies (hyperthyroidism, diabetes mellitus).

Fable 2: Clinical presentation of severe feline	pancreatitis (from	Xenoulis and Steiner,	2008)
---	--------------------	-----------------------	-------

Sign	Prevalence	
History :		
Anorexia	63-97%	
Lethargy	28-100%	
Vomiting	35-61%	
Weight loss	21-61%	
Diarrhea	11-33%	
Physical exam:		
Dehydration	33-92%	
Hypothermia	40-65%	
Icterus	16-24%	
Fever	Up to 25%	
Abdominal pain	19-75%	
Abdominal mass	rare	

#### **Diagnostic approach**

The most useful tests for ruling out other diseases and diagnosing feline pancreatitis are CBC, chemistry panel, serum PLI and diagnostic imaging.

CBC and chemistry panel are most useful to rule out diseases with similar clinical presentation. Pancreatic lipase immunoreactivity (fPLI) and abdominal ultrasound may deliver the most useful information about the pancreatic inflammation. Cats with pancreatitis may occasionally show nonspecific neutrophilia or non-regenerative anemia. Increased liver enzyme activity (ALT, GGT and ALP), or increased bilirubin and cholesterol are present in half to two thirds of cases. This may be due to cholestasis associated with concomitant liver disease (e.g. cholangiohepatitis or hepatic lipidosis) or to bile duct compression. Hyperglycemia is often due to stress, but some cats may also have concomitant diabetes mellitus. Hypocalcemia is a negative prognostic factor, particularly if the ionized calcium is below 1.0 mmol/l (reference range 1.2-1.4 mmol/l). Amylase and lipase activities have no diagnostic value in cats.

Two pancreas-specific tests have been recently developed to determine the serum immunoreactivity of trypsin (TLI) and pancreatic lipase (PLI). These tests are species-specific, therefore test kits designed for use in the dog are of no interest in the diagnosis of feline pancreatitis. TLI represents the gold standard for diagnosis of exocrine pancreatic insufficiency (EPI), and is only useful in cases of advanced pancreatitis with destruction of the gland resulting in EPI. Moreover, feline TLI testing is not readily available in Europe. PLI is a very promising test in the diagnosis of feline pancreatitis, even though large clinical studies to validate its clinical efficacy are still lacking. Several preliminary studies have shown that it was useful in the diagnosis of feline pancreatitis. PLI is a proprietary test (fPL®, Idexx Laboratories) that is now available in many countries for laboratory and cage-side use.

Diagnostic imaging often plays an important part of the diagnosis of feline pancreatitis. Abdominal radiographs are usually not useful. Abdominal ultrasonography is the most interesting imaging modality; however its sensitivity and diagnostic specificity are good to average depending on the case. Detailed examination of the pancreas, particularly its left lobe, may be difficult in obese cats and those whose abdomen is painful or tense, or in the presence of large quantities of gas in the surrounding structures. Moreover, the value of information obtained depends heavily on the experience of the ultrasonographer who should have an excellent knowledge of abdominal anatomy. Acute pancreatitis is often characterized by enlargement and hypoechoic appearance of the pancreas. The surrounding mesentery may appear hyperechoic. Ultrasound offers the advantage of exploring the abdomen to look for concomitant diseases of liver, gastrointestinal tract or other abdominal organs. In addition, advanced techniques of harmonic power Doppler and the use of ultrasound contrast agents seem promising to increase the sensitivity of ultrasound and help differentiate pancreatic diseases of the cat.

Histological analysis of pancreatic biopsies taken during exploratory laparotomy or laparoscopic examination remains the diagnostic standard to which other methods are compared. However, it has been shown that inflammatory lesions can be focal and difficult to identify at the time of surgery. Under such circumstances, cryptic sites of inflammation may be missed resulting in false negative results. On the other hand, clinically irrelevant lesions of chronic pancreatitis are present in a significant proportion of healthy cats

In summary, the diagnosis of feline pancreatitis is best achieved by combining various diagnostic modalities that are all relatively imperfect when used separately. The advent of the feline PLI test provides a new interesting tool that must still undergo thorough evaluation.

#### Therapeutic approach

To date, there are no clinical studies evaluating treatment regimens for feline pancreatitis. Symptomatic therapy is indicated to correct dehydration and electrolyte disturbances, if present. It is important to prevent pancreatic ischemia to break the vicious circle of inflammation. During acute episodes severely affected cats may develop systemic complications such as systemic inflammatory response syndrome (SIRS), and aggressive treatment using synthetic colloids or plasma may be required.

Cats do not show abdominal pain as clearly as dogs and humans do. However, it is likely that abdominal pain significantly contributes to anorexia. Therefore, pain medication is often recommended, preferably using opiates. Butorphanol (0.1 mg / kg IV or 0.2-0.4 mg / kg sc every 4 to 6 hours) and buprenorphine (0.01-0.03 mg/kg SC or PO for transmucosal absorption every 8 to 12 hours) are two frequent choices in cats.

Vomiting should be controlled with antiemetics. In acute episodes, a fasting period of 1 to 2 days may be beneficial, but is not without risk of causing liver lipidosis. Nutritional support is important and can be provided with enteral feeding. Esophagostomy or gastrostomy tubes are easy to place and offer a good solution for cats that don't vomit. Commercial liquid diets are well tolerated despite their relatively high fat content. It is essential to start the diet gradually so as not to overload the stomach. The immediate goal is to feed the intestinal mucosa to prevent bacterial translocation. Partial or total parenteral nutrition may be useful in severely debilitated cats.

The use of anti-inflammatory drugs is controversial. Steroids appear contraindicated in acute pancreatitis. However, they have been used successfully in cats with chronic pancreatitis. They can cause a decrease in fPLI, suggesting a decrease in the inflammatory process. The doses of prednisolone used are 1 to 2 mg/kg orally every 12 to 24 h.

Pancreatitis may cause hypocobalaminemia since the pancreas plays an important role in the absorption of vitamin B12. Serum cobalamin concentration can easily be determined, and replacement therapy should be initiated in case of hypocobalaminemia. The weekly cobalamin dose is 250 µg SC for 6 weeks; it is recommended to reassess the cobalamin levels monthly and adjust therapy accordingly.

Finally, identified concomitant diseases must be treated with the same vigor as pancreatitis. Thus, it may be necessary to administer antibiotics in case of suppurative cholangiohepatitis, provide a hypoallergenic diet and corticosteroids in cases of IBD or to change the diet and consider treatment ACE inhibitors in cats with chronic kidney disease.

#### Prognosis

The prognosis of feline pancreatitis varies considerably from case to case. It depends on the severity and extent of the inflammatory process or the importance of necrotic foci. Cats with severe acute necrotizing pancreatitis are subject to numerous complications and the associated mortality can be quite high. Those suffering from chronic recurrent pancreatitis of mild to moderate severity obviously have a better prognosis. However, it is possible that chronic pancreatic disease eventually causes EPI and/or diabetes mellitus.

#### References

De Cock, HE, Forman, MA, Farver, TB, Marks, SL: Prevalence and histopathologic characteristics of pancreatitis in cats. Vet Pathol. 44(1), 2007, 39–49

Ferreri, J, Hardam, E, Van Winkle, TJ, et al.: Clinical differentiation of acute and chronic feline pancreatitis. J Am Vet Med Assoc. 223, 2003, 469–474.

Forman, MA, Marks, SL, DeCock, HE, et al.: Evaluation of feline pancreatic lipase immunoreactivity and helical computed tomography versus conventional testing for the diagnosis of feline pancreatitis. J Vet Intern Med. 18, 2004, 807–815.

Hill, R, van Winkle, T: Acute necrotizing pancreatitis and acute suppurative pancreatitis in the cat. J Vet Intern Med. 7, 1993, 25-33.

Kimmel, SE, Washabau, RJ, Drobatz, KJ: Incidence and prognostic significance of ionized hypocalcemia in feline acute pancreatitis. J Am Vet Med Assoc. 219, 2001, 1105–1109.

Washabau RW. Pancreas: necrosis and Inflammation - feline. In Washabau RW and Day MJ (eds) Canine and Feline Gastroenterology. W.B. Saunders Company, 2012, 821-829.

Weiss DJ, Gagne JM, Armstrong PJ. Relationship between inflammatory hepatic disease and inflammatory bowel disease, pancreatitis, and nephritis in cats. J Am Vet Med Assoc 1996; 209: 1114-1116.

Xenoulis PG, Steiner JM. Current concepts in feline pancreatitis. Top Companion Anim Med 2008;23:185-192.