



Pancreatitis

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P Profile

DEFINITION

Pancreatitis is an inflammatory disease of the pancreas that can be acute or chronic.¹ Both forms can be mild or severe.¹ Severe pancreatitis is often associated with pancreatic necrosis, multiple systemic complications, and a poor prognosis.¹

Genetic Implications. Heredity plays an important role in pancreatitis in humans, but no genetic predisposition has been described for dogs or cats. Miniature schnauzers have an increased incidence of pancreatitis, suggesting a hereditary component; however, this has not been confirmed.

Incidence/Prevalence. The true incidence and prevalence of pancreatitis in dogs and cats are unknown. Studies of necropsy findings have shown evidence of pancreatitis in 0.6% and 1.0%, respectively, of all examined pancreata. However, recent evidence would suggest that, as in humans, more than 90% of all cases remain undiagnosed.

Signalment. Both dogs and cats are affected. Miniature schnauzers are predisposed but there are no other clinically relevant breed, age, or gender predilections.

Causes and Risk Factors. Most cases are idiopathic. In dogs, a main cause is dietary indiscretion. Blunt trauma (car accidents, falling from great heights, or surgical trauma), hypotension (particularly due to anesthesia), infections (*Toxoplasma gondii* and

Amphimerus pseudofelineus in cats), and pharmaceuticals (e.g., organophosphates, L-asparaginase, vinca-alkaloids, and potassium bromide) are all potential causes of pancreatitis. Corticosteroids have recently been removed from the list of drugs implicated in causing pancreatitis in humans, and there is little evidence to suggest that corticosteroids cause pancreatitis in dogs or cats.

Pathophysiology. Pancreatitis is ultimately caused by autodigestion of the pancreas. The cascade leading to autodigestion involves premature activation of proteolytic and phospholipolytic digestive enzymes within pancreatic acinar cells.² The digestive enzymes cause both local and distant damage and may elicit an inflammatory response that can have local and systemic effects.³

SIGNS

Clinical signs of pancreatitis are nonspecific in dogs and even more vague in cats.^{4,5} Most commonly reported in dogs are vomiting, weakness, abdominal pain, and dehydration.⁴ In cats, lethargy, anorexia, dehydration, and hypothermia are the most common clinical signs.⁵ Vomiting and abdominal pain are only reported in 35% and 25% of feline pancreatitis cases, respectively.⁵ *Abdominal pain is the key clinical sign in humans with pancreatitis and should be suspected and treated in every dog and cat with this disease.* Abdominal pain often becomes evident only after therapy has been instituted.

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Hemorrhagic pancreatitis at surgery

Courtesy Dr. Michael Schaer, University of Florida

Dx **Diagnosis**

LABORATORY FINDINGS

CBC results in dogs and cats with pancreatitis are nonspecific. Thrombocytopenia, neutrophilia with a left shift, and anemia are the most common findings in dogs.⁴ In cats, leukopenia and leukocytosis occur with nearly equal frequency, as do hemoconcentration and anemia.⁵

Findings on serum chemistry analysis are also nonspecific. Both dogs and cats with pancreatitis commonly have elevated hepatic enzyme activities, azotemia, hyperbilirubinemia, hypoalbuminemia, hyperglycemia, and hypocalcemia.^{4,5}

DIAGNOSTIC IMAGING

Radiographic findings in dogs and cats with pancreatitis are subjective and include loss of detail in the area of the pancreas, shifting of abdominal organs, and increased intestinal gas.⁴ Abdominal radiographs are more useful for excluding other differential diagnoses (such as a radiodense foreign body) than in diagnosing pancreatitis per se.

Abdominal ultrasonography is highly specific for pancreatitis when stringent criteria are applied. Enlargement of the gland, fluid accumulation around the gland, hypoechoic appearance with a hyperechoic surrounding, hyperechoic appearance of the gland, or a swollen duodenal papilla can all be observed, but enlargement and fluid accumulation alone are not sufficient for a diagnosis.^{4,6} Sensitivity of abdominal ultrasonography is largely operator-dependent and has been reported to be up to 68% in dogs and 35% in cats.^{4,6,7} A recent study reported a much higher sensitivity in cats, but two of three cats with no histopathologic evidence of pancreatitis were diagnosed with pancreatitis ultrasonographically,

suggesting that stringent criteria may not have been applied.

MINIMALLY INVASIVE TESTS

Serum amylase and lipase activity has been used to diagnose canine pancreatitis for decades, but measurement of these activities detects pancreatitis in only approximately 50% of all canine cases.⁸ Also, about 50% of patients with elevated serum amylase or lipase activity do not have pancreatitis.⁹ Thus, these tests are of limited value for diagnosis of canine pancreatitis. They should only be used until more accurate diagnostic tests, such as an abdominal ultrasonography or serum PLI, can be performed. In cats, serum amylase and lipase activities are of no diagnostic value.¹⁰

Serum TLI concentration is specific for exocrine pancreatic function and is the test of choice for exocrine pancreatic insufficiency in both dogs and cats. However, sensitivity of serum TLI concentration is limited to 30% to 60%^{7,9} and results must therefore be evaluated in conjunction with other diagnostic tests to be clinically useful.

Assays for the measurement of canine and feline PLI have recently been developed and validated. Serum PLI is highly sensitive and specific for pancreatitis in both dogs and cats^{11,12} and is much more sensitive than any other diagnostic test. The reference range for serum PLI concentrations in dogs is 2.2 to 102.1 µg/L with a cut-off value for pancreatitis of 200 µg/L; for cats it is 2.0 to 6.7 µg/L with a cut-off value for pancreatitis of 12 µg/L. Both assays are currently available only through the Gastrointestinal Laboratory at Texas A&M University (www.cvm.tamu.edu/gilab).

HISTOPATHOLOGY

A definitive diagnosis of pancreatitis can be made on the basis of histopathologic criteria.

However, although histopathology is the gold-standard in terms of specificity, histopathology lacks sensitivity. Recent data have shown that pancreatitis can be highly localized.¹³ Also, gross lesions are only present in less than 10% of all cases, and several biopsies are crucial for identifying any lesions. Thus, lack of evidence of pancreatic inflammation or necrosis does not necessarily rule out pancreatitis.

Tx **Treatment**

Treatment strategies for pancreatitis depend primarily on the severity of the disease. Severe pancreatitis, whether in a canine or feline patient, should be treated with aggressive fluid therapy.^{14,15} Whenever possible, the cause of the disease should be addressed. Patients should also be carefully monitored for development of any systemic complications, such as hypotension, renal failure, disseminated intravascular coagulation, respiratory failure, or multiorgan failure.¹⁴ Early intervention against these complications is the key to treatment success.

Analgesic therapy is extremely important in both dogs and cats with pancreatitis.^{14,15} Meperidine, fentanyl, morphine, or intra-abdominal lidocaine have all been used for pain control. Antiemetics should only be used in cases of incessant vomiting or if the patient is mentally impaired and/or considered to be at increased risk for aspiration. Empirically, fresh frozen plasma is believed to be useful by most clinicians and should be considered for the most severe cases.¹⁴

Other treatment strategies, such as antibiotics, cytokine inhibitors, antisecretory agents, antiinflammatory agents, protease inhibitors, antacids, antioxidants, dopamine, or surgical intervention, have

CBC = complete blood count; PLI = pancreatic lipase immunoreactivity; TLI = trypsin-like immunoreactivity

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not been shown to be useful in dogs or cats with pancreatitis.¹⁴

Dogs and cats with mild pancreatitis should be carefully assessed for any **identifiable causes**. If the patient is on any medication at time of presentation, need for that medication should be carefully evaluated and the medication should be switched to an alternative medication if deemed necessary. Serum calcium and 18-hour fasting serum triglyceride concentrations should also be assessed.

Cats with mild chronic pancreatitis may be infested with the hepatic fluke *Amphimerus pseudofelineus*. Little is known about this parasite or its prevalence, but empirical treatment with praziquantel may be beneficial.

Dogs and especially cats with chronic pancreatitis may also have concurrent disease, most commonly diabetes mellitus, inflammatory bowel disease, and cholangiohepatitis. Management of these **comorbid conditions** is very important for the overall treatment success. Treatment of concurrent inflammatory bowel disease with corticosteroids seems safe and does not appear to aggravate pancreatic inflammation further.

NUTRITION

Patients that are not vomiting should be fed via the oral route. Vomiting patients should be given nothing by os until the vomiting subsides. Food can be withheld from canine patients for a few days without serious complications, but alternative feeding strategies must be considered in cats to avoid secondary hepatic lipidosis. A jejunostomy tube is the preferred route of alimentation but is often impractical. Total and partial parenteral nutrition are other alternatives but are inferior to a jejunostomy

at a glance

Proven Treatments

- Treatment of cause
- Aggressive fluid therapy
- Rigorous monitoring
- Early intervention against complications
- Resting the pancreas (NPO)

- Nutritional support
- Analgesia
- Antiemetic therapy

Unproven Treatments

- Protease inhibitors ?
- Plasma ?
- PAF inhibitors ?
- Antibiotics ?

- Antiinflammatory agents ?
- Antacids ?
- Antisecretory agents ?
- Dopamine ?
- Selenium ?
- Surgical therapy ?

tube and may also be impractical.

Empirically, at least in dogs, a low-fat diet should be chosen. The fat content of the diet, especially in miniature schnauzers, appears to play a crucial role in long-term outcome.

In General

Relative Cost.

- mild chronic cases: \$250-\$500
- severe acute cases: > \$1000

Actual costs will have regional variations.

Follow-up

Patient Monitoring. Serum PLI concentration can be used for follow-up because of its sensitivity for pancreatic inflammation, and this marker also may be elevated in patients with subclinical disease.

Prognosis. The prognosis is directly related

to severity of disease. Patients with mild chronic pancreatitis may do well in the long term but may also develop intermittent episodes of severe disease. Patients with severe disease, especially if systemic complications are present, have a poor prognosis.

Future Considerations

Recent data suggest that, as in humans, most cases of canine pancreatitis go undiagnosed. The situation is probably similar in cats. With the availability of more sensitive diagnostic tests, it is likely that we will eventually be able to diagnose even subclinical forms of pancreatitis, leading to a need for refinement of therapy for these cases. ■

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

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