

# Pancreatitis – Canine

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## Definition

*Pancreatitis* is an inflammatory condition that can be acute or chronic. Clinical signs can range from mild with minimal systemic effects to extremely severe disease characterized by pancreatic necrosis leading to the systemic inflammatory response syndrome (SIRS) and circulatory collapse.

## Key Diagnostic Tools and Measures

Pancreatitis can be a challenging condition to diagnose as, aside from pancreatic biopsy, there are no specific diagnostic tests for this disease. To arrive at a diagnosis, the clinician will need to rely on his/her acumen utilizing the patient's clinical presentation (vomiting, abdominal pain, cardiovascular status), the results of clinical chemistry (serum chemistry, complete blood count [CBC], and urinalysis coupled with pancreatic biomarkers such as canine pancreatic lipase immunoreactivity [cPLI] and canine trypsin-like immunoreactivity [cTLI]), and imaging. A complete diet history should be taken that includes information about the commercial pet foods and treats the patient is fed including any table foods or scraps and whether there is any history of dietary indiscretion (see Appendix II).

The patient's nutritional status should be assessed with special attention paid to the duration of anorexia, evidence of weight loss (in particular, muscle wasting), severity of gastrointestinal (GI) signs, feasibility of assisted feeding, and concurrent medical conditions.

## Pathophysiology

Often the inciting cause of pancreatic inflammation remains unknown although numerous drugs, dietary indiscretion, trauma, surgical manipulation, and ischemia have been implicated. The condition results from the failure of the protective mechanisms that normally ensure that the zymogens stored within the cells of the pancreas remain in an inactive form until they enter the duodenum. The activation of these zymogens within the pancreatic tissue unleashes their proteolytic effects resulting in tissue damage and inflammation.

The inflammatory response that accompanies severe pancreatitis produces a catabolic state that can cause a rapid deterioration in nutritional status. This decline in nutritional status is complicated by the fact that it is necessary to withhold food from patients that are experiencing nausea, vomiting, abdominal pain, ileus, or hemodynamic instability. Many patients with acute pancreatitis will present with hyperlipidemia.

## Signalment

In general, older dogs (>5 years), obese dogs, and certain breeds (terriers, miniature schnauzers, Shetland sheepdogs) are reported to be at increased risk for developing pancreatitis.

## Key Nutrient Modifications

Avoidance of oral intake of high-fat foods has been advocated for patients recovering from pancreatitis. Although this recommendation has not been evaluated by a prospective randomized clinical trial, it is based upon several different rationales. First, as fat (as well as protein) is a potent stimulant of pancreatic secretion, the concern in a convalescent patient is that pancreatic over-stimulation might lead to a relapse. Second, with regard to prevention of recurrent disease, investigations in dogs have shown that a low-protein, high-fat diet can induce pancreatitis and that pancreatitis is more severe when induced in dogs that had been fed a high-fat diet.<sup>1,2</sup> Furthermore, there is evidence that hyperlipidemia may be an inciting factor for pancreatitis.

## Recommended Ranges of Key Nutrients

Nutrient	% DM	g/100 kcal	% DM	g/100 kcal
	Recommended dietary level		Minimum dietary requirement*	
Fat	10–14	2–3.5	5	1.4

Modified intake of these nutrients may help address metabolic alterations induced by disease states. The recommended dietary composition is shown as percent of dietary dry matter and as g or mg per 100 kcal metabolizable energy. All other essential nutrients should meet normal requirements adjusted for life stage, lifestyle, and energy intake.

\*Nutrient requirement for adult animals as determined by the Association of American Feed Control Officials

## Therapeutic Feeding Principles

Classically food has been withheld from patients with moderate to severe acute pancreatitis with the aim of reducing pancreatic stimulation and thereby presumably reducing pancreatic secretions. Recently this dogma has been challenged in management of human patients. There is evidence that management schemes designed solely to promote pancreatic rest and minimize secretions have succeeded only in achieving pain relief and have not been shown to have an impact on patient outcome.<sup>3</sup>

Patients with moderate to severe pancreatitis are in a catabolic state and will experience a rapid decline in nutritional status. Furthermore, human prospective randomized clinical trials have shown improved outcomes when patients receive early enteral feeding via jejunostomy tube (j-tube) as opposed to parenteral nutrition (PN).<sup>4</sup> Results have varied from trial to trial but most have found that enteral feeding via j-tubes attenuates the acute phase response and leads to a reduction in overall complications, including septic complications, when compared with PN.

The goal, therefore, for the management of canine pancreatitis is to encourage voluntary oral food intake in patients with mild or resolving clinical signs. Initially, the patient should be offered water, and based on response this is followed by a diet that is high in carbohydrates but low in fat and contains adequate but not high protein. Food should be offered in small meals 4 to 6 times per day.

In cases in which oral intake is contraindicated due to persistent nausea and vomiting, dogs should be evaluated as candidates for assisted feeding. If possible, they should receive a complete and balanced diet by the enteral route. Even patients with severe pancreatitis are able to tolerate j-tube feeding. When enteral feeding access is unobtainable in a patient for whom assisted feeding is indicated, parenteral nutritional support should be initiated.

■ **Treats** – Table foods and scraps that are high in fat should not be used as treats for patients that have recovered from a bout of pancreatitis. This includes most meats, dairy products (unless they are non-fat varieties), and fried foods or snacks. Appropriate treats include most dog biscuits, fresh fruits and vegetables (with the exception of grapes and onions), very lean meats (e.g., baked chicken breast), and pasta.

■ **Tips for Increasing Palatability** – There are a number of therapeutic and commercial dog foods to choose from that will meet the guidelines for moderate to low fat content, and it should be possible to find an appropriate diet that is acceptable to most patients. Adding some warm water to a dry food, slightly warming a canned food, or adding a few tablespoons of low-sodium, plain canned tomato sauce to a food may enhance acceptance.

■ **Diet Recommendations** – Transition the patient onto a complete and balanced diet that has adequate protein and moderate fat content (<30% fat, energy basis). Most dry and canned gastrointestinal therapeutic diets will meet this criterion and it is possible that the patient's normal diet will

as well. Patients with idiopathic hyperlipidemia may require greater dietary fat restriction (<20% fat, energy basis). Patients should be monitored for food acceptance, recurrence of clinical signs, and weight maintenance.

For patients in good body condition, feeding portions should be based on previous caloric intake. For underweight patients, calories offered should be increased by 20% above previous intake to promote weight gain during convalescence and adjusted as necessary based upon response. For overweight patients, a weight reduction program should be prescribed once the patient has fully recovered from pancreatitis.

### Client Education Points

- All members of the household should understand that there is a potential risk of recurrent disease.
- The clients should be aware of any dietary and feeding recommendations and the reasons for them. Of particular importance is restricting the pet’s access to high-fat foods, treats, table scraps, and garbage.
- When a patient is under- or overweight upon discharge from the hospital, there should be discussion of what additional nutritional management will be necessary in the coming weeks to ensure a return to an optimal body weight. The owner should understand why taking such steps will be beneficial for the patient.

### Common Comorbidities

Often a patient with acute pancreatitis will present with **hyperlipidemia**. While in many cases the elevation in serum lipid concentration is a consequence of the pancreatitis, there is evidence that pre-existing hyperlipidemia can be causative agent of this condition. Hyperlipidemia can be associated with a high-fat meal, a concurrent endocrinopathy (hyperadrenocorticism, diabetes mellitus, or hypothyroidism), or a breed

disposition (miniature schnauzers, Shetland sheepdogs). When hyperlipidemia is secondary to underlying condition, naturally the best therapeutic approach is to address that condition. Patients with primary hyperlipidemia may benefit from a very low fat diet (<20% fat, energy basis) as will some patients who have this condition secondary to other diseases (see pages 80–81). Pancreatitis may also occur concurrently in dogs with **diabetes mellitus** (see pages 28–29).

### Interacting Medical Management Strategies

Patients with moderate to severe acute pancreatitis will require aggressive fluid resuscitation and supportive care that can include colloid support, antiemetics, gastroprotective agents, and analgesics. While pain control is an important aspect of the medical management of pancreatitis, some analgesic agents can cause gastrointestinal ileus. Ileus can depress a patient’s appetite and therefore delay the return of voluntary intake or complicate the delivery of enteral nutrition in a patient receiving tube feeding. Ileus can be addressed by weaning the patient off of analgesic medication as soon as feasibly possible or switching to a medication that has fewer gastrointestinal side effects.

### Monitoring

Patients that either needed to regain or lose weight after discharge from the hospital should have their weight monitored to ensure that appropriate progress is being made. Patients that are being treated for primary hyperlipidemia will require rechecks to monitor serum lipid concentrations to determine if the level of dietary fat restriction is sufficient. Any future visit to the clinic, regardless of purpose, is an opportunity to inquire about the patient’s dietary management and chance to reinforce previous feeding recommendations.

## Algorithm – Nutritional Management of Canine Pancreatitis

