

Gastroenteritis / Vomiting – Feline

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Definition

Gastroenteritis is an inflammatory disease of the stomach and intestine. Cellular infiltrates (eosinophils, lymphocytes, plasma cells) into the lamina propria, submucosa, and/or muscularis are characteristic and indicate the type (i.e., eosinophilic or lymphocytic-plasmacytic [LPL]) of gastroenteritis. Gastric ulcers/erosions may develop.

Key Diagnostic Tools and Measures

Key features of gastroenteritis in cats include a history of intermittent chronic vomiting and/or diarrhea, loss of body weight/condition, peripheral eosinophilia, nonregenerative anemia, and cobalamin deficiency. Diagnostic tools include minimum database plus thyroxine (T₄), FeLV/FIV serology, fasting serum trypsin-like immunoreactivity (TLI), and cobalamin assay. Barium contrast studies, abdominal ultrasound, and endoscopy can help evaluate disease distribution, stomach/intestinal wall thickness, and facilitate biopsy diagnosis.

Pathophysiology

Irritation/injury to the mucosa and/or abnormal immune response leads to disruption of the mucosal barrier and recruitment and infiltration of inflammatory cells. Ongoing mucosal damage results in loss of gastrointestinal (GI) barrier function, decreased blood flow, and altered gut motility. Foreign body ingestion, dietary intolerance, motility disorder, irritant or toxin ingestion, drugs, and infectious agents are common primary GI causes. Renal disease, liver disease, pancreatitis, and hyperthyroidism are common systemic causes.

Signalment

Lymphocytic-plasmacytic enteritis, an associated cause of inflammatory bowel disease (IBD), is more common in animals 2 years of age or older but is seen occasionally in kittens. No breed predilections are described. Hyper eosinophilic syndrome occurs more frequently in middle-aged, female domestic short-haired (DSH) cats. Foreign body ingestion, parasitic, and infectious etiologies are more common in younger animals, while metabolic, neoplastic, or drug-induced causes are more common in older animals. Intestinal motility disorders are seen in middle-aged male DSH, domestic long-haired (DLH), and Siamese cats.

Key Nutrient Modifications

Inflammation associated with gastroenteritis adversely alters nutrient digestion and absorption. Dietary modifications should focus on overall diet digestibility, ideally choosing a very highly digestible diet ($\geq 90\%$). The protein source should be altered to something the pet has not previously been exposed to, and the content limited to one, possibly two, high-quality protein sources fed at reduced levels. The dietary fat level should be altered based on the location of GI inflammation. Highly digestible soluble carbohydrate sources fed at reduced quantities are preferable. Diets with increased moisture content (canned vs. dry) help counter fluid losses. Increased dietary potassium, chloride, and sodium can help correct electrolyte alterations. Omega-3 fatty acids can provide an anti-inflammatory function.

Recommended Ranges of Key Nutrients

Nutrient	% DM	g/100 kcal	% DM	g/100 kcal
	Recommended dietary level		Minimum dietary requirement*	
Protein	32–42	7.5–9.5	26	6.5
Fat	15–24	3.5–6.0	9	2.3
Fiber [#]	1–2.5	0.2–0.5	n/a	n/a
		mg/100 kcal		mg/100 kcal
Potassium	0.75–1.1	180–250	0.6	150
Sodium	0.3–0.5	70–85	0.2	50
Omega-3 fatty acid	1–1.5	200–300	n/a	n/a

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 (DM) 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

[#]Soluble fibers are preferred. The crude fiber analysis includes most insoluble fibers, but does not include soluble fibers. Therefore, crude fiber has limited usefulness when evaluating the total fiber content of foods. The ingredient list should be evaluated for sources of soluble fiber.

Therapeutic Feeding Principles

Nutritional goals are to minimize gastric irritation/vomiting, reduce gastric/intestinal secretions, promote gastric emptying, normalize gut motility, minimize residue, and meet determined nutritional requirements.

Initial treatment for acute, non-life-threatening vomiting includes nothing by mouth (NPO) for 12 to 24 hours with intravenous (IV) correction of fluid and electrolyte deficits if severely dehydrated. As vomiting resolves, offer small volumes of water or ice cubes orally (PO). If tolerated, gradually reintroduce an enteral diet. Initial re-feeding targets are to gradually re-introduce an enteral diet. Initial re-feeding targets are 25% to 33% of resting energy requirement (RER) calories, with gradual increases over several days to provide RER, then daily energy requirement (DER) at current body weight (BW). Small meals, multiple times per day (three to six) minimize any adverse GI response and increase diet assimilation. Specific diet characteristics and target nutrient levels include:

- Total diet digestibility $\geq 90\%$.
 - Novel or hydrolyzed protein source. Ideally, a single, high quality protein source of high digestibility ($>87\%$). Target protein intake between 7.5 and 9.5 g/100 kcal consumed; 32% to 42%, DM basis.
 - Target fat intake between 3.5 and 6.0 g/100 kcal; diet 15% to 24% fat, DM.
 - Low insoluble fiber content to increase digestibility. Target fiber intake between 0.2 and 0.5 g/100 kcal (1% to 2.5%, DM) with fermentable fiber sources such as pectin, guar gum, gum arabic, and beet pulp.
 - Adjusted potassium (K⁺), sodium (Na), and chloride content. Target electrolyte intake between 180 and 250 mg K⁺/100 kcal; 0.75% to 1.1%, DM and 70 to 85 g Na/100 kcal; 0.3% to 0.45%, DM.
 - Mild fluid losses should be replaced orally through clean, fresh water and/or moist diet. Moderate–severe losses should be restored parenterally with appropriate crystalloid solutions.
 - Omega-3 fatty acid content ~ 250 mg/100 kcal; 75 to 100 mg/kg BW. Target dietary omega-6:omega-3 at $\leq 2:1$.
 - Probiotic supplementation can be considered, but it generally is more commonly indicated with clinical diarrhea.
- Treats – Treats are not routinely recommended when managing

gastrointestinal disorders. If treats are a necessary component of the daily feeding regime, choose highly digestible treats providing a novel or hydrolyzed protein source and moderate fat content. A small portion of the chosen dry diet or a complementary hydrolyzed dry kibble product can be presented as a treat. Bite-sized, baked treats can be made from the chosen canned diet. Caloric contribution from treats should not exceed 10% of total daily calories.

■ **Tips for Increasing Palatability** – Vomiting can be associated with food aversions. To circumvent this issue, review the ingredient list/nutrient content of the patient’s diet pre-GI disturbance, and identify disease management diets with different nutrient sources (i.e., protein, fat) for the re-feeding process.

Warm the canned diet to slightly above room temperature to enhance aroma. Add warm water or warmed low sodium broth or cooking juice to the dry food. If feeding a novel or hydrolyzed protein source, the broth or juice should be derived specifically from that protein source.

■ **Diet Recommendations** – Highly digestible therapeutic diets formulated for manage of gastroenteritis can be referred to as *gastroenteric, gastrointestinal, intestinal, or low residue diets*. Novel or hydrolyzed protein/carbohydrate diets are commonly referred to as *anti-inflammatory, food allergic, hypoallergenic, limited antigen, low allergen, or skin and coat formula diets*. Senior life-stage diets may be acceptable.

Start re-feeding at or below RER (current BW) with the long-term goal of delivering DER calories at optimal BW.

Client Education Points

- Cats with infectious or parasitic causes of gastroenteritis may be contagious to other animals or even zoonotic. Exposure to other animals and handling of these patients should be done with caution.
- Animals diagnosed with IBD may have a genetic component and/or immune system disorder and may be predisposed to other diseases. Spaying and neutering of affected animals should be discussed due to hereditary potential.

- Inflammatory GI conditions are not cured but rather managed medically and nutritionally. Treatment(s) and follow-up may be life-long. Dietary changes should be done gradually. Debilitated patients may require hospitalization and parenteral nutrition.

Common Comorbidities

Dehydration, malnutrition, hypoproteinemia, anemia, kidney failure, liver failure, hyperthyroidism, pancreatitis, pancreatic exocrine insufficiency, neoplasia, and FeLV/FIV are common comorbid conditions in cats with gastroenteritis or vomiting.

Interacting Medical Management Strategies

H₂ receptor antagonism and proton pump inhibition can decrease absorption of B vitamins and iron due to decreased acid release. Cytoprotectants form a mucosal barrier, inactivate pepsin, absorb bile salts, and may bind to nutrients causing decreased nutrient absorption. Prokinetics alter the rate of food delivery and absorption in the small intestine by influencing gut motility. Chronic administration of steroids can decrease calcium absorption. Metronidazole can cause reversible neurotoxicity at high doses. Antibiotic administration changes microbial flora of the digestive tract and can chelate minerals (Ca, Mg, Fe, Zn) affecting nutrient metabolism and absorption. Azathioprine can cause bone marrow suppression in cats.

Monitoring

Monitor hydration through sequential packed cell volume (PCV), urine specific gravity, and/or skin tent response. Utilize serum chemistry values to evaluate electrolyte status and renal function. Follow-up imaging can ascertain changes in stomach/intestinal wall thickness and disease distribution. Body weight and body condition score (BCS) changes reflect nutrient utilization and/or ongoing losses. If there is minimal or no improvement in key measures, reassess feeding plan components (patient, diet, feeding method) to reformulate a nutritional support plan based on new developments or previously overlooked parameters.

Algorithm – Nutritional Management of Feline Gastroenteritis / Vomiting

