

Feline IBD: Pathophysiology, Treatment Goals, & Client Communication

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Inflammatory bowel disease (IBD) refers to a group of chronic, idiopathic gastrointestinal (GI) disorders characterized by histopathologic lesions of mucosal inflammation. IBD today is considered the most common cause of chronic diarrhea and vomiting in dogs and cats.^{1,2} The generic term, IBD, encompasses lymphoplasmacytic enteritis, lymphocytic gastroenterocolitis, eosinophilic gastroenterocolitis, segmental granulomatous enterocolitis (regional enteritis), suppurative enterocolitis and histiocytic colitis. The lymphoplasmacytic form is probably the most common type of IBD. More specifically to felines, the most commonly identified idiopathic inflammatory bowel disorders are lymphoplasmacytic enteritis, benign lymphocytic enteritis, and lymphocytic-plasmacytic colitis. The severity of IBD varies from relatively mild clinical signs to life-threatening protein-losing enteropathies. Inflammatory infiltrates may involve the stomach, small bowel and colon. In cats, the stomach and small bowel are affected most often.^{1,3} Lymphocytes and plasmacytes are the cell infiltrates most commonly found within the lamina propria of the gastrointestinal (GI) tract.

Diarrhea and vomiting are common complaints from cat owners. Veterinary nurses/technicians must be familiar with IBD and the causes of this disease and work with the entire healthcare team to alleviate the signs and symptoms observed in cats presenting to the hospital.

Patient Assessment

Weight loss is the most common clinical sign in cats followed by vomiting, anorexia, and diarrhea.^{4,5} Weight loss often is unnoticed, especially by the pet owner due to its very gradual progression over weeks to months. Cats typically lose muscle tissue first and may develop significant sarcopenia. This is remarkably appreciable along the spine, before adipose tissue is lost. Historically, IBD was believed to affect middle-age³ to older pets. More recently it has been reported that cats with IBD tend to be younger, with a median reported age of approximately 8 years (and has been seen in pets as young as 4 months).^{4,6-8} There does not appear to be a breed or gender predilection when talking of IBD, with the exception of domestic shorthair and Siamese appearing more represented.⁴ The predominant GI sign varies with the portion or portions of bowel affected. When the stomach and proximal duodenum are affected, vomiting tends to be the predominant clinical sign. Loose, fluid or steatorrheic stools are common when the small intestine is involved. Diarrhea manifested by tenesmus, mucus and small sparse stools is noted with colonic lesions.² IBD clinical signs and symptoms are variable. Clinical signs may be intermittent or persistent. Clinical signs tend to increase in frequency and intensity as IBD progresses temporally. The presence of systemic signs is also variable. Some animals present with a history of lethargy, malaise and inappetence, while others are alert and active at the time they are examined. The frequency and character of the vomitus and stools are important to note. At times, vomiting will be related to food intake and the vomitus will contain food particles, while in other cases, animals may vomit only fluid or froth. Veterinary nurses/technicians should question owners closely about the appearance of the vomited material. Dark black or 'coffee grounds' type material is indicative of gastric ulceration or erosions. Also, diarrhea may be small or large bowel in origin and thus the color of the stools should be assessed to determine the presence of GI bleeding.

When performing a physical examination on cats with IBD, remember that findings will vary among patients. Often, abdominal fat pads are preserved even in otherwise cachectic cats. Beside sarcopenia and a mostly low body condition score, physical examination may reveal segmental or diffusely thickened intestinal loops and abdominal discomfort/pain often located in the cranial abdomen.⁴ It is important to remember that no two cats will present the same; some may have no abnormalities while other cats may present with weight loss and poor body condition and still others with hemorrhage or hypoproteinemia.

A thorough history should be taken including: signalment, medication history, vaccination history, deworming schedule, medical history, exposure to toxins, etc. A very thorough nutritional history should also be taken including: feeding regimen, diet fed, type of diet (canned, dry, semi-moist), feeding plan, household member responsible for feeding the cat, treats, toys, medication aids (pilling/medication aids). Another piece of the history should focus on the cat's environment, what enrichment if any is in the cat's environment, location and type of litterbox, other pets in the environment, etc.

Pathophysiology

The pathophysiology of inflammatory bowel disorders is not fully understood, despite a number of studies by veterinary and medical researchers. The disorder is undoubtedly immune-mediated; however, the pathogenesis of the various forms of IBD is poorly defined. Intestinal biopsy specimens from cats with IBD have identified abnormal cytokine mRNA expression. The primary pathway for the development of IBD involves hypersensitivity. However, the underlying cause for hypersensitivity reactions is unknown. Two related theories have been proposed. The first theory speculates that patients suffering from IBD have developed a defect in the intestinal mucosal barrier. This loss of mucosal integrity results in increased gut permeability and hypersensitivity responses to antigens that are normally tolerated. Alternatively, IBD may result from aberrant immunologic responses to luminal antigens. It has been hypothesized that defects in gut-associated lymphatic tissue (GALT) suppressor function may predispose patients to development of hypersensitivity to normally tolerated luminal antigens.²

Parasites, pathogenic organisms, normal gut flora and dietary antigens may all serve as the trigger for these immunologic reactions. Both potential pathways culminate in release of inflammatory mediators. These substances may then further damage the intestinal mucosal surface and set up a vicious cycle of inflammation and loss of barrier function. It is likely that the pathogenetic pathway is influenced by environmental (i.e., exposure to dietary antigens or GI parasites) and genetic factors that modulate disease expression. The predisposition for IBD in certain canine breeds (e.g., Basenjis, soft-coated wheaten terriers) suggests a potential genetic role. Mucosal inflammatory infiltrates and soluble factors are responsible for the clinical manifestations of IBD. Mucosal inflammation disrupts normal absorptive processes resulting in malabsorption and osmotic diarrhea. Altered gut permeability can result in leakage of fluid, protein, and blood into the gut lumen. Malabsorbed fats, carbohydrates and bile acids result in secretory diarrhea. Inflammatory mediators may also trigger intestinal secretion and mucus production by goblet cells. Mucosal inflammatory infiltrates may alter intestinal and colonic motility patterns, a mechanism attributed to the influence of prostaglandins and leukotrienes on smooth muscle. Inflammation of the stomach and small bowel may stimulate visceral afferent receptors that trigger vomiting. Delayed gastric emptying associated with gastroparesis or ileus may exacerbate vomiting.

Treatment

Dietary allergens may play a role in the cause of IBD in felines, so it makes sense that dietary therapy might be beneficial. The underlying principle for dietary therapy using an antigen-restricted or hydrolyzed diet is that restricting exposure to dietary antigens known to evoke sensitivity will decrease exaggerated host responses and attenuate intestinal inflammation. Other indications for specialized nutritional therapies include managing cats with a decreased appetite, impaired nutrient absorption, or specific nutrient (e.g, cobalamin) deficiencies. Dietary therapy should be instituted upon diagnosis of IBD and in cats with mild IBD, it may be the only therapy necessary to achieve resolution.

Key Nutritional Factors

Water

Dehydration is a common problem in patients suffering from IBD. Reduced water consumption is often aggravated by fluid losses from vomiting and/or diarrhea.

Fluid balance should be maintained through oral consumption of fluids. Nevertheless, dehydrated patients and those with persistent vomiting may need parenteral fluid.

Electrolytes

Serum electrolyte concentrations should be assessed regularly to allow early detection of abnormalities as vomiting and diarrhea persist. Hypokalemia is particularly common in patients with IBD.^{2,9} Thus, foods containing 0.8 to 1.1% dry matter (DM) potassium are preferred. Potassium levels should be restored with intravenous potassium supplementation. Remember, affected patients often lose large amounts of sodium through diarrhea and, sodium deficits may be masked by dehydration.

Energy Density and Fat

Energy dense foods are preferred for managing patients with chronic enteropathies. Such foods allow the provision of smaller volumes of food, which minimizes GI distention and secretions. Unfortunately, energy dense foods are also high in fats. High-fat foods may contribute to osmotic diarrhea and GI protein losses, which complicate IBD. Thus, it is often advantageous to initially provide a food with moderate energy density (4.0 to 4.5 kcal/g DM) and fat levels of 15 to 25% DM). Foods with higher fat levels can be offered as tolerated by the patient.^{2,9} Fiber-enhanced foods typically have lower energy density levels than highly digestible foods because fiber-enhanced foods are usually lower in fat. The DM energy density of fiber enhanced foods for IBD should be at least 3.4 kcal/g for cats. Fat content in fiber-enhanced foods for cats with IBD should be 9 to 18% DM. Normal cats can tolerate much higher concentrations of dietary fat than dogs. Anecdotal information suggests that foods with increased fat content may actually benefit cats with small bowel disease.

Protein

Special attention must be paid to the potential of protein malnutrition in cats with IBD due to fecal losses through diarrhea. High biological value, highly digestible ($\geq 87\%$) protein sources should be used. Protein should be provided at levels sufficient for the appropriate lifestage for patients not experiencing excessive GI protein loss (35% for adult cats [DM]). Suggested protein levels for patients being managed with hypoallergenic foods” can be lower. Because dietary antigens are suspected to play a role in the pathogenesis of IBD, “hypoallergenic” novel protein elimination foods or foods containing a protein hydrolysate are often recommended. In some cases, elimination foods may be used successfully without pharmacologic intervention. Ideal elimination foods should: 1) avoid protein excess, 2) have high protein digestibility and 3) contain a limited number of novel protein sources to which the cat never been exposed or contain a protein hydrolysate.

Fiber

A number of substrates including beet pulp, soy fiber, inulin and fructooligosaccharides have shown through in vitro fermentation to produce volatile fatty acids that may be beneficial in IBD involving the distal small intestine and colon. These fermentable fibers may serve as prebiotics and cultivate the growth of beneficial bacteria such as *Bifidobacterium* and *Lactobacillus* at the expense. These fibers are usually incorporated at rates of 1 to 5% DM in commercial products.^{2,9} It is prudent to increase dietary fiber content to normalize intestinal motility, water balance and microflora. Fiber has several physiologic characteristics beneficial to managing small bowel diarrhea. Moderate levels (7 to 15% DM) of insoluble fiber add nondigestible bulk, which buffers toxins, holds excess water and, provides intraluminal stimuli to reestablish the coordinated actions of hormones, neurons, smooth muscle, enzyme delivery, digestion and absorption. Fiber can help normalize transit time through the small bowel, to reestablish normal peristaltic action. However, this level of fiber reduces the energy density and digestibility of a food.

Prebiotics and probiotics

Increasing evidence shows a potential therapeutic role for prebiotic and probiotic agents in human IBD.^{3,10} If IBD in cats is similarly driven by impaired tolerance to components of the intestinal microbiota then prebiotics and probiotics may prove beneficial as primary therapies or in combination with dietary and drug therapy. In looking at the effects of prebiotics on the intestinal microbiota in healthy cats, one study found fructooligosaccharides (FOSs) supplemented at 0.75% dry matter produced qualitative

and quantitative changes in the fecal flora.^{3,11} More data on the use of probiotics to treat IBD in cats is needed. A commercial probiotic (ie, FortiFlora – *Enterococcus faecium* strain SF68) was reported to be of benefit in controlling diarrhea in cats housed in an animal shelter.^{3,12}

Pharmacologic Therapy

It is important that veterinary nurses/technicians familiarize themselves with pharmacologic therapies used for treating and managing IBD in cats. Drug therapy includes the use of corticosteroids, antibiotics, and various immunosuppressive agents. Medication recommendations are determined by the clinical severity of disease, the segments of the GI tract involved, the character of the histopathologic lesions, and micronutrient (cobalamin) status. Many veterinarians utilize therapies concurrently in cats with severe disease - diet, antibiotics, steroids and/or immunosuppressive drugs.

Corticosteroids are looked to first when dealing with IBD. Cats with mild to moderate cases of IBD typically respond well to a prednisolone starting dose of 0.5 to 1 mg/lb divided twice a day for two to four weeks. This is followed in 2 week intervals by a gradual decline of 50%. Cats typically respond very well and every other day or every third day doses can often be met in about two to three months. It has been suggested that younger cats with IBD typically do not need to be treated as long as middle age to older IBD cats.

It has been suggested that metronidazole be used as a single drug agent or in combination with glucocorticoids for treatment of IBD.³ The mechanisms of action of metronidazole in reducing intestinal inflammation are believed to include antiprotozoan and antibacterial activities,¹³ and potentially immunomodulatory effects. It is well known that metronidazole can be associated with poor patient compliance due to its bitter taste and tendency to promote inappetence. A recommended alternative formulation is metronidazole benzoate. This is reportedly better tolerated by cats, most likely due to a marked difference in taste.

Methylprednisolone acetate can be used as a sole therapy or an adjunct therapy. It is reported that consistent control of signs in cats with moderate to severe symptoms are harder to control when methylprednisolone acetate is used alone. Veterinary technicians should note that use of methylprednisolone acetate should be reserved for situations where the owner cannot consistently give tablet or liquid preparations orally.

Budesonide is a glucocorticoid that is a newer alternative for IBD management – especially when dealing with severe cases that are refractory to prednisolone, metronidazole, and dietary management or cannot tolerate corticosteroids. Typical dose for cats is 1 mg once per day.

If combination therapy is warranted, metronidazole is the first choice to be used concurrently with prednisolone. Typically for IBD, a dose of 5 to 10 mg/lb BID is recommended.

Summary

Veterinary nurses/technicians must be familiar with IBD and the causes of this disease and work with the entire healthcare team to ease the signs and symptoms observed in cats presenting to the hospital.

Veterinary nurses/technicians play an important role in monitoring IBD feline patients and their response to treatment and should be attentive in looking for the following:

1. Corticosteroid– inadequate initial or long term maintenance dose
2. Moderate to severe IBD – failure to use ancillary medications
3. Failure of the healthcare team to recognize and treat a concurrent condition
4. Poor owner compliance
5. Treating only small intestinal inflammation when colitis is present as well
6. Failure to recognize and treat low body cobalamin levels

7. Failure to identify effective nutritional therapy

References

1. Garraway K, Allenspach K, Jergens A. Inflammatory Bowel Disease in Dogs and Cats. *Today's Veterinary Practice*. January/February, 2018.
2. Davenport D, Jergens AE, Remillard RL. Inflammatory Bowel Disease. In *Small Animal Clinical Nutrition 5th Ed.* Hand M, Thatcher, Remillard R, Roudebush P, Novotny B, eds. 2010, Mark Morris Institute, KS
3. Jergens AE. Feline Idiopathic Inflammatory Bowel Disease What we know and what remains to be unraveled. *Journal of Feline Medicine and Surgery*. (2012) **14**, 445–458
4. Marsilio S. Differentiating Inflammatory Bowel Disease from Alimentary Lymphoma in Cats: Does It Matter? *Vet Clin Small Anim* 51. 2021. 93–109.
<https://doi.org/10.1016/j.cvsm.2020.09.009>
5. Burke KF, Broussard JD, Ruaux CG, et al. Evaluation of fecal a1-proteinase inhibitor concentrations in cats with idiopathic inflammatory bowel disease and cats with gastrointestinal neoplasia. *Vet J* 2013;196:189–96.
6. Marsilio S, Pilla R, Sarawichitr B, et al. Characterization of the fecal microbiome in cats with inflammatory bowel disease or alimentary small cell lymphoma. *Sci Rep* 2019;9:19208.
7. Janeczko S, Atwater D, Bogel E, et al. The relationship of mucosal bacteria to duodenal histopathology, cytokine mRNA, and clinical disease activity in cats with inflammatory bowel disease. *Vet Microbiol* 2008;128:178–93.
8. Jergens AE, Crandell JM, Evans R, et al. A clinical index for disease activity in b cats with chronic enteropathy. *J Vet Intern Med* 2010;24(5):1027–33.
9. Burns KM. Nutritional Management of Gastrointestinal Disorders. In *Nutrition and Disease Management for Veterinary Technicians and Nurses. 2nd ed.* Wortinger A, Burns KM, eds. 2015, Wiley-Blackwell, Ames, IA
10. Ewaschuk JB and Dieleman LA. Probiotics and prebiotics in chronic inflammatory bowel diseases. *World J Gastroenterol* 2006; 12: 5941–5950.
11. Sparkes AH, Papasouliotis K, Sunvold G, Werrett G, Gruffydd-Jones EA, Egan K, et al. Effect of dietary supplementation with fructo-oligosaccharides on fecal flora of healthy cats. *Am J Vet Res* 1998; 59: 436–440.
12. Bybee SN, Scorza AV, Lappin MR. Effect of the probiotic *Enterococcus faecium* SF68 on presence of diarrhea in cats and dogs housed in an animal shelter. *J Vet Intern Med* 2011; 25: 856–860.
13. Janeczko S, Atwater D, Bogel E, Greiter-Wilke A, Gerold A, Baumgart M, et al. The relationship of mucosal bacteria to duodenal histopathology, cytokine mRNA, and clinical disease activity in cats with inflammatory bowel disease. *Vet Microbiol* 2008; 128: 178–193.