Diseases of the Canine Colon

Frédéric P. Gaschen, DVM, DACVIM Louisiana State University

Baton Rouge, LA

In clinical practice inflammatory diseases of the colon are frequently encountered in dogs. In many instances, acute non-specific colitis may be self-limiting. However, chronic colitis is often associated with a long, sometimes waxing and waning clinical course and a systematic approach is required to rapidly identify the best therapeutic options. Chronic idiopathic large bowel diarrhea is diagnosed in dogs that do not have any histologic evidence of significant colonic inflammation. The condition occurs much less frequently than colitis. In most cases, it appears to respond to diet change and fiber supplementation. Finally, the colon is the site most affected by neoplasia in the canine digestive tract. Fortunately, these tumors, although malignant, tend to grow slowly, and only rarely metastasize.

Objective of the presentation

• To review the main causes of colonic diseases in the dog, their diagnostic approach, and their management, with emphasis on colitis

Colitis

Infectious causes

Intestinal parasites (especially whipworms) are a common cause of large bowel diarrhea in dogs. Fecal parasitological analysis (fecal flotation, preferably using a centrifugation technique) is an important first step in the approach of such cases. However, it is important to remember that multiple negative consecutive fecal samples are required in order to definitely rule out parasite infestation. Alternatively, a broad spectrum anthelmintic can be administered (e.g. fenbendazole, 50 mg/kg p.o. daily during 3-5 days).

Bacterial infections may be implicated in the pathogenesis of canine colitis. Clostridia are large Gram-positive, strict anaerobic bacteria. Clostridium perfringens is widespread in the environment and can be present in feces of healthy animals. C. perfringens type A produces enterotoxin (also called C. perfringens enterotoxin or CPE). Enterotoxigenic C. perfringens are commonly associated with food poisoning in humans. CPE can be detected in fecal samples using immunoassays such as ELISA. Alternatively, PCR can detect bacteria which possess cpe, the gene encoding CPE. Although C. perfringens could be cultivated from canine fecal samples in 76-86% of healthy and 71-75% of diarrheic dogs, only 5-14% of isolates from healthy dogs and 15-34% of those from dogs with diarrhea were enterotoxigenic. Enterotoxigenic strains have been associated with nosocomial canine diarrhea, hemorrhagic enteritis, and acute or chronic large and/or small bowel diarrhea. Isolation of C. perfringens in canine feces is not sufficient for the diagnosis of C. perfringens-associated disease. Endospore counts performed on fecal smears are also unreliable. Moreover, the clinical value of cpe PCR or CPE ELISA as accurate markers of pathogenicity of C. perfringens remains to be determined: fecal CPE was detected in nondiarrheic dogs, however it was more prevalent among in diarrheic dogs. Fecal "PCR profiles" have recently become commercially available; however presence of fecal clostridial DNA or even of cpe does not imply that the bacteria play a causal role in a dog with colitis. In summary, accurate diagnosis of clostridial infections is nearly impossible in clinical practice. Therefore, empirical treatment is often administered if C. perfringens is the suspect cause of acute colitis. The following antimicrobials are efficacious against C. perfringens: metronidazole (10-15 mg/kg BID), amoxicillin (10-20 mg/kg BID to TID), and tylosin (10-20 mg/kg BID). Other bacteria that may be associated with colitis include Clostridium difficile and Campylobacter spp.

Fungal diseases may affect the GI tract in endemic regions. Histoplasmosis is a systemic fungal infection of dogs and cats. Dogs infected with histoplasma may show signs of large bowel diarrhea. Rectal scraping or ultrasound guided aspiration of enlarged abdominal lymph nodes may be diagnostic and reveal large number of fungal organisms phagocytosed by macrophages. Treatment of choice is itraconazole. Pythiosis is caused by an oomycetal organism and most commonly causes large granulomatous masses affecting the small intestines. It may occasionally diffusely infiltrate the colonic and rectal wall and cause severe clinical signs. The prognosis is generally poor.

Adverse food reaction (AFR)

In a recent study, 56% of 70 dogs with chronic diarrhea responded to an elimination trial with a novel protein diet. Of those 39 dietresponsive dogs, 27 (69%) exclusively showed large bowel diarrhea while 9 (23%) had mixed large and small bowel signs. Based on this data, an elimination trial with novel protein diets chosen on the basis of the animal's dietary history or with hydrolyzed diets should be initiated. Clinical signs generally abate within 10-14 days of treatment.

Inflammatory bowel disease (IBD)

IBD is an idiopathic inflammation of the digestive tract causing non-specific clinical signs associated with an inflammatory infiltration of the intestinal wall. Abnormal interactions between the host's innate immune system and the intestinal microbial flora are the probable trigger of a cascade of reactions leading to inflammation of clinical relevance. While it appears that IBD most often affects

the small intestine or both small and large intestine concurrently (especially in cats), colonic IBD is a recognized disease. Synonyms are lymphocytic plasmacytic colitis, eosinophilic colitis, etc.

The diagnostic approach must be comprehensive in order to rule out all other causes of colitis (see above and fig. 1). If colonic IBD is suspected in dogs, anti-inflammatory treatment may be initiated with sulfasalazine (10-30 mg/kg [max. 1 g. total dose] PO TID) for 4-6 weeks. Sulfasalazine liberates 5-amino-salycilic acid in the colon, and is widely used in the treatment of dogs with colitis. After completion of the initial treatment regimen, it is best to slowly decrease the dose in stages of 10-14 d. Monitoring tear production regularly during treatment is essential as KCS is a common complication. Olsalazine (5-15 mg/kg BID to TID) may be used in dogs that do not tolerate sulfasalazine.

In dogs refractory to sulfasalazine or olsalazine, immune-suppressive prednisone treatment is the next logical therapeutic step. However, colonoscopy with sampling of colonic mucosal biopsies is recommended prior to initiating immunosuppressive treatment. This diagnostic procedure will confirm the presence of colonic inflammation and rule out other diseases such as histiocytic ulcerative colitis (see below) or neoplasia. Endoscopy of the large intestine requires appropriate preparation with prolonged fasting (24-48 hrs), administration of electrolyte solutions with osmotic laxative effects, and possibly enemas. Rigid proctoscopy can be performed in sedated dogs, however a full exam of rectum, colon and cecum is only possible using flexible endoscopes under general anesthesia.

The prognosis for IBD is generally better when only the colon is affected. However, one retrospective study of dogs with IBD didn't find any association between localization of disease and outcome. Nevertheless, various clinical studies clearly demonstrate that a large majority of dogs with colitis will respond completely to dietary modification and/or to sulfasalazine treatment (dogs).

Histiocytic ulcerative colitis (HUC)

HUC is a form of inflammatory bowel disease that occurs most frequently in young Boxer dogs, or infrequently in other breeds, such as Mastiffs, Alaskan Malamutes, French Bulldogs, English Bulldogs. Large numbers of coccobacilli were found in the colonic mucosa by fluorescent in-situ hybridization in Boxers affected with HUC but not in histologically normal tissues or in the mucosa of dogs with other types of colitis. Further studies identified the bacteria to be a particular strain of E. coli (LF82) that adheres to and invades intestinal epithelial cells. These E. coli are taken up by endosomes and persist in the macrophages instead of being cleared. A genetic predisposition for HUC is suspected due to the preponderance of cases in young Boxer dogs.

The onset of disease occurs predominantly before 2 years of age. Clinical signs include severe chronic large intestinal inflammation with diarrhea, hematochezia, increased frequency of defecation, tenesmus, and presence of excessive mucus in the feces. Although physical examination findings are most frequently normal, weight loss and inappetence can be seen in severe cases. In these dogs, colonoscopy typically reveals sites of severe colonic hemorrhage and ulcerations interspersed with stretches of normal appearing mucosa. Histology may show severe infiltration with neutrophils, macrophages, lymphocytes, plasma cells and mast cells. Accumulation of large macrophages staining strongly positive with Periodic Acid Schiff (PAS) in their cytoplasm is pathognomonic for HUC. Use of fluorescent in situ hybridization (FISH) is recommended for definitive confirmation of the diagnosis.

Treatment of HUC consists of enrofloxacin at 5-10 mg/kg PO BID for 4-6 weeks. Most affected dogs respond within 10-14 days of initiating therapy. While several dogs were reportedly disease-free after the drug had been discontinued, there is increasing evidence that HUC may relapse after treatment in some cases. Recent reports suggest that up to 43% of dogs with HUC develop enrofloxacin resistance early in the disease process and may be refractory to treatment if they are treated empirically. Therefore, It may be prudent to send intestinal biopsies for culture and sensitivity before starting treatment, so that the use of antibiotics can be tailored to the specific sensitivity profile of the cultured E. coli.

Non-specific treatment of colitis

Symptomatic treatment of colitis includes dietary manipulations and drug therapy. Because food intolerance and food allergy may be involved in the pathogenesis of colitis, administration of a novel protein source or hydrolyzed peptides is a logical choice. Additionally, most hypoallergenic diets manufactured by the pet food industry have an optimized ratio of n6 to n3 polyunsaturated fatty acids which can be beneficial to decrease the inflammatory response.

Soluble fiber supplementation may be beneficial for all dogs and cats with colitis as it provides the colonic epithelial cells with short-chain fatty acids after being processed by the colonic flora. Psyllium may be offered with every meal (initial dosage 0.5 tbs with each meal for cats, up to 3 tbs for large dogs, then adapt based on stool consistency). Fructooligosaccharides (FOS) and beet pulp are other sources of soluble fiber. The value of probiotics has not been clearly demonstrated for dogs and cats with colitis, but there is hope that they may shorten the recovery time. Finally, metronidazole (10-15 mg/kg BID) is often the first line agent for drug therapy.

Chronic idiopathis large bowel diarrhea

Chronic idiopathic large bowel diarrhea (CILBD) is a descriptive diagnosis reached by exclusion of the most common diseases associated with chronic large bowel diarrhea. The disease appears to be relatively common among dogs referred for colonoscopy. A significant proportion of dogs with CILBD experience behavioral problems or are exposed to a stressful environment. Most dogs respond to diet change and fiber supplementation in the form of a high fiber diet, or psyllium added to the meal. Some dogs benefit from behavior-modifying therapy.

Colonic neoplasia

Colonic neoplasia is usually associated with signs of hematochezia and dyschezia, while tenesmus and constipation can also be observed, depending on the exact location of the tumor. In dogs, colonic tumors are the most prevalent gastrointestinal tumors. They usually affect the distal colon and rectum more than the proximal parts of the large bowel. Benign polyps and adenomas may occur infrequently. Common malignant tumor types include adenocarcinoma, stromal tumors (such as leiomyosarcoma) and lymphoma. Local tumor invasion is slow, and distant metastases are rare.



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