

G - Gastroenterology

LARGE INTESTINAL DIARRHEA - CAUSES AND TREATMENT

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The large intestine plays an important role in the digestion, however it is not involved in the active absorption of nutrients. Electrolyte transport, water absorption, mucus secretion, bacterial fermentation of fiber to easily absorbed short-chain fatty acids, immune surveillance, and motility are the main physiological events associated with the large bowel.

The prevalence of large bowel diarrhea in small animals affected with chronic diarrhea may differ according to geographic location and the

environment of the animal. In cats, diseases affecting exclusively the large intestine occur less frequently than those involving the small bowel or the whole length of the intestine. The associated clinical signs are typical for that segment of the intestine, and reflect the failure of water extraction and defecation control. In most cases, they can be easily differentiated from those resulting from small intestinal disease, as shown in the following table.

Clinical sign	Small intestinal disease	Large intestinal disease
Frequency of defecation	Normal or only slightly increased	Moderately to severely increased
Fecal volume per defecation	Normal to increased	Often decreased
Presence of mucus	No	Frequent
Presence of blood	Melena (digested blood) Possibly hematemesis	Hematochezia (fresh blood)
Tenesmus	No	Yes
Urgency	No	Yes
Flatulence	Possible	Uncommon
General condition	May be decreased (lethargy)	Generally unaltered
Appetite	Inappetence, anorexia frequent	Alteration uncommon
Abdominal discomfort	Possible	Possible
Vomiting	Rel. common	Possible
Weight loss	Frequent (if chronic)	No

As is the case in small bowel disease, intestinal parasites (especially whipworms) are the most common reason for large bowel diarrhea. Therefore, parasitological analysis of the feces is the first diagnostic test to apply (e.g. fecal flotation, preferably using a centrifugation technique,

special test for protozoa, and fecal smears). It is important to remember that three consecutive fecal samples must be negative for parasite ova or cysts in order to rule out parasite infestation. Alternatively, a broad spectrum anthelmintic can be administered to eliminate most endoparasites

(e.g. fenbendazole, 50 mg/kg p.o. daily during 5 days). Beside parasite infestation, causes of large bowel diarrhea include idiopathic inflammatory bowel diseases (IBD), food intolerance, histiocytic ulcerative colitis (HUC), clostridial infections, and a disease similar irritable bowel syndrome (IBS) in humans.

For a discussion of food intolerance and IBD, the reader is referred to the lectures on small intestinal diarrhea and chronic diarrhea. It is noteworthy that 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. In many instances, mucosal biopsies of the ileum can be sampled during the procedure.

In recent years, the pathogenesis of HUC in the dog has been at least partially elucidated. This rare disease seems to affect mainly brachycephalic breeds, even though it has been diagnosed in other breeds as well. For many years HUC was thought to be an immune-mediated disorder, and was treated with immune-suppressive doses of corticosteroids without success. However, recently the disease was shown to respond to enrofloxacin therapy at usual doses. Additional research made it possible to detect a deep-seated mucosal infection with *E. coli* in dogs with HUC.

Clostridia are large Gram-positive, strict anaerobic bacteria. Some *clostridia* are part of the normal intestinal microbial flora. However, *Clostridium perfringens* type A as well as *Clostridium difficile* may produce gastrointestinal disease and enterotoxemia in dogs.

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. 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 assay as an accurate marker of pathogenicity of *C. perfringens* remains to be determined: fecal CPE was detected in non-diarrheic dogs, however it was more prevalent among in diarrheic dogs. The following antibiotics are reported efficacious against *C. perfringens*: in acute cases metronidazole (10 mg/kg BID for 7 days), amoxicillin (10-20 mg/kg BID to TID for 7 days), in chronic cases with intermittent signs long-term tylosin (10-20 mg/kg BID) may be preferable.

Clostridium difficile produces two major toxins (toxins A and B), and is a common cause of nosocomial and antimicrobial-associated enteric infections in humans that may lead to potentially fatal pseudomembranous colitis. In various studies, *C. difficile* was cultured from the feces of healthy puppies and their dams, healthy adult dogs and cats, and diarrheic dogs and cats presented to veterinary clinics. *C. difficile* was also isolated from feces of dogs with nosocomial diarrhea. Production of toxins A and/or B was detected significantly more frequently in diarrheic pets than in healthy pets. Therefore, a causal relationship between enterocolitis and *C. difficile* should only be suspected if toxins A and/or B can be detected in a fecal sample. *C. difficile* infections are best treated with metronidazole at usual dosages.

In some dogs showing large bowel diarrhea no diagnosis can be made in spite of a comprehensive diagnostic workup including colonoscopy and histological evaluation of mucosal biopsies. By analogy to a syndrome known in humans, irritable bowel syndrome (IBS) is suspected in these dogs. The etiology has not been elucidated, but recurring diarrheic episodes may be associated with stressful events, and psychological factors are believed to play a role (nervous dogs, dogs with abnormal behavioral traits). The diagnosis is based on a history of chronic recurring large bowel diarrhea, commonly with hematochezia, occasionally with bloating and abdominal pain, and possible behavioral problems after other known causes of large bowel diarrhea could be ruled out. Symptomatic treatment includes the addition of fiber to the diet (e.g. psyllium). Dogs that respond to fiber supplementation alone have an excellent prognosis. However, additional therapy is usually necessary, and a combination of antispasmodics and sedatives is given [Librax® (Roche) – suggestive dosage: 0.1-0.25 mg/kg clindium BID to TID to be given at the time of stressful events, or when the first clinical signs of an episode are noticed]. Although IBS does not resolve in dogs requiring this combination treatment, the syndrome can be kept under control with appropriate and timely medication.

Symptomatic treatment of colitis includes dietary manipulations and drug therapy. The administration of an easily digestible diet is recommended. Because food intolerance and food allergy may be involved in the pathogenesis of colitis, administration of a hypoallergenic diet based on a novel protein source or hydrolyzed peptides is a logical choice. 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. Supplementation with fermentable fiber plays a central role in the treatment of colitis, and exerts numerous positive effects on the colonic mucosa. It also favorably influences the composition of the large intestinal bacterial flora. While some commercial diets with increased fiber content are available, supplementation of the diet with psyllium (approximately 1-1.5 g/kg daily with food) is also effective. Metronidazole (10 mg/kg BID) is often the first line agent for drug therapy.

Sulfasalazine liberates 5-amino-salicylic acid in the colon, and is widely used in the treatment of dogs with colitis (10-25 mg/kg p.o. BID to TID, can be increased up to 50 mg/kg TID, not to exceed a total dose of 3 g/day). The duration of treatment may be brief in mild cases (7-14 days), while moderate to severe case with a chronic recurring colitis may need to be treated for months to year. In such cases, the lowest effective dose should be determined by progressively decreasing the dosage. Keratoconjunctivitis sicca is a possible complication of sulfasalazine therapy, and it is advisable to check tear production regularly, especially in dogs receiving long term treatment. In cats, administration of immune-suppressive doses of corticosteroids is preferred and often successful.

A list of references can be obtained by sending an e-mail request to the author.