

# Clostridial Enterotoxigenesis

(Diarrhea Related to an Intestinal Toxin Produce by a Bacteria, *Clostridium perfringens*)

## Basics

### OVERVIEW

- A complex and poorly understood syndrome characterized by diarrhea in dogs and cats associated with a particular bacteria, *Clostridium perfringens* (abbreviated as CP)
- “Clostridial” refers to the bacteria, *Clostridium* (several species of the bacteria exist)
- “Entero-” refers to intestinal; “toxicosis” is the medical term for any condition caused by toxins or poisons
- The bacteria release a toxic compound called “enterotoxin” and this along with positive fecal cultures for the organism provides best evidence of diarrhea caused by Clostridial enterotoxigenesis

### SIGNALMENT/DESCRIPTION OF PET

#### Species

- Dogs
- Cats
- Suspected that up to 34% of diarrhea cases in dogs are *Clostridium perfringens*-related; far less common in cats

#### Mean Age and Range

- Disease may occur in any age pet; most pets that develop long-term (chronic) clinical signs tend to be middle-aged or older

### SIGNS/OBSERVED CHANGES IN THE PET

- Clinical signs are associated with sudden (acute) self-limiting diarrhea, lasting for 5–7 days; long-term (chronic) intermittent diarrhea; or signs associated with other gastrointestinal or non-gastrointestinal disease
- Chronic signs often are characterized by intermittent episodes recurring every 4–6 weeks that may persist for months to years; the syndrome may result as a hospital-acquired disease (known as “nosocomial disease”) with signs precipitated during or shortly following hospitalization or boarding at a kennel
- *Clostridium perfringens* has been associated with sudden bloody stomach and intestinal inflammation (known as “acute hemorrhagic gastroenteritis”) and is frequently observed at the same time with pets having parvovirus
- Most common sign is large-bowel diarrhea characterized by fecal mucus, small amounts of fresh blood, small scant stools, straining to defecate (known as “tenesmus”) with increased frequency of stools
- Dogs may have signs of small-bowel diarrhea characterized by a large volume of watery stool
- Other signs include vomiting, passing gas (flatulence), passage of blood in the bowel movement or stool (known as “hematochezia”), abdominal discomfort, or a generalized unthriftiness (lack of thriving) in chronic cases



- Evidence of system-wide illness or poor-doing (debilitation) is rare; abdominal discomfort may be detected when the veterinarian feels the abdomen (palpation) during the physical examination; fever is uncommon

## CAUSES

- It is unknown if the intestinal toxin-producing (known as “enterotoxigenic”) *Clostridium perfringens* is a true infection or if the bacteria normally is present in the pet's system and due to certain conditions (such as stress), it produces the intestinal toxin and causes disease (known as an “opportunistic pathogen”)
- Only certain strains of *Clostridium perfringens* are capable genetically of producing the intestinal toxin and only certain pets are affected clinically; the disease may be associated with the development of an excessive number of bacteria in the small intestine (a condition known as “small intestinal bacterial overgrowth”)
- Diarrhea may be associated with dietary indiscretions or diet change

## RISK FACTORS

- Stress factors to the gastrointestinal tract; dietary change, other disease conditions existing at the same time, or hospitalization may precipitate signs
- The ability of *Clostridium perfringens* to cause disease (known as the “pathogenicity”) may depend on the status of the gastrointestinal tract, including its metabolic, mucosal, and immune integrity
- Possibly related to a decrease in Immunoglobulin A (known as “IgA deficiency”) in which a normal immunity-related protein in the intestinal tract is too low to be effective in protecting the intestinal tract from infection and/or the toxin
- A higher pH (known as being alkaline) within the intestinal tract promotes bacteria to produce spores (known as “sporulation”) and toxins (enterotoxin production)
- Primary intestinal bacterial overgrowth

## Treatment

### HEALTH CARE

- Most treated as outpatients
- Hospitalization may be required when diarrhea or vomiting is severe, leading to dehydration and electrolyte imbalance
- Fluid and electrolyte therapy may be required to replace losses occurring from diarrhea, especially if afflicted by HGE (see explanation above)

### ACTIVITY

- Restricted during sudden (acute) disease

### DIET

- Diet plays a role in the treatment and management of pets with chronic recurring disease; high fiber diets (either soluble/fermentable or insoluble fiber) often result in clinical improvement by reducing the number of *Clostridia* bacteria in the intestinal tract and by making the lower intestine more acidic, thus limiting the production of spores and toxins of *Clostridium perfringens*
- Commercial high-fiber diets can be supplemented with psyllium as a source of soluble fiber under the direction of your pet's veterinarian
- Diets low in fiber should be supplemented with fiber (such as coarse bran) as a source of insoluble fiber or psyllium as a source of soluble fiber under the direction of your pet's veterinarian
- Probiotics may be beneficial to help prevent recurrence of diarrhea by altering the balance of resident intestine microorganisms (known as “microbiota”)

## Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Sudden (acute) severe disease usually requires antibiotics for 5 days; most pets respond well to antibiotic therapy (such as oral ampicillin or amoxicillin, metronidazole, or tylosin)
- Antibiotics will not be used in those patients with mild disease because the disease typically resolves

- Probiotics (such as lactobacillus or others) may alter the balance of intestine microbes and so reduce the likelihood of recurrence of diarrhea
- Chronic cases may respond well to high-fiber diets and changing the diet may be attempted as the sole therapy following resolution of signs

## Follow-Up Care

### PATIENT MONITORING

- The pet's response to antibiotic therapy does not confirm a diagnosis, further testing is warranted
- Monitoring for dehydration and other parameters is needed for those with moderate to severe disease

### PREVENTIONS AND AVOIDANCE

- Feeding high fiber diets or probiotics may decrease the incidence of this type of diarrhea

### EXPECTED COURSE AND PROGNOSIS

- Most pets respond well to therapy
- Chronic cases may require long-term therapy to control clinical signs
- Failure in response to therapy suggests other existing disease conditions and further diagnostic evaluation is needed

## Key Points

- A complex syndrome characterized by diarrhea in dogs and cats associated with a particular bacteria, *Clostridium perfringens*
- Suspected that up to 34% of diarrhea cases in dogs are *Clostridium perfringens*-related; much less common in cats
- Clinical syndromes are (1) sudden (acute) self-limiting diarrhea, lasting for up to 5-7 days; (2) chronic intermittent diarrhea; (3) signs associated with other gastrointestinal or non-gastrointestinal disease
- Sudden (acute disease) is often self-limiting, while chronic cases may require prolonged therapy