

## Enterocolitis, Acute (Canine)

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### Contributors:

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### ● Synonyms

Acute colitis

Acute enteritis

Acute large bowel diarrhea

Acute small bowel diarrhea

### ● Disease Description

#### Definition

Acute enterocolitis is rapid onset of inflammation of the small and/or large intestines.<sup>1-3</sup> It can lead to acute diarrhea.<sup>1-3</sup> Diarrhea is one of the most common presenting complaints of enterocolitis. Acute enterocolitis is more common in dogs than cats.<sup>1-3</sup>

Diarrhea can be categorized as small or large bowel diarrhea. Small bowel diarrhea results from diseases of the small intestines and associated structures (e.g. exocrine pancreas). Large bowel diarrhea is primarily associated with colonic disease, and to a lesser degree, cecal dysfunction.<sup>14</sup> Dogs and cats can experience concurrent small and large bowel diarrhea in cases of diffuse intestinal disease, or as a result of secondary effects of large bowel disease. Acute diarrhea is most often associated with small bowel or generalized intestinal disease.<sup>17,18</sup>

#### Etiology

Numerous causes of acute diarrhea exist, most of which involve the small intestines. Pathogens of primarily the large intestines (LI) or that cause generalized, small and large intestinal disease (SLI) are denoted as such.

**Infectious Agents:** Numerous organisms can cause acute enterocolitis. Viral agents include parvovirus [SLI], rotavirus, coronavirus, canine adenovirus, canine distemper virus, feline torovirus, feline astrovirus, and reovirus. Bacterial infections tend to cause SLI and include *Salmonella* spp., *Campylobacter jejuni*, *Clostridium perfringens*, *Yersinia* spp., and *Escherichia coli*. Fungal infections include histoplasmosis (SLI) and pythiosis. Protozoal agents that infect the intestines include *Giardia*, *Isospora*, *Cryptosporidium*, and *Tritrichomonas* (LI) spp. Protothecosis often involves the LI. Intestinal parasites are the most common cause of both small and large bowel diarrhea.<sup>15</sup> They include hookworms (SLI), roundworms, whipworms (LI), and tapeworms (SLI).<sup>4-6</sup>

**Dietary Indiscretion:** Dietary indiscretion is a common cause, especially in dogs. Ingestion of garbage, plants, foreign objects, toxins, and table scraps frequently results in acute diarrhea. Rapid diet change; introduction of a new diet; or food hypersensitivity can also cause diarrhea.<sup>4</sup> In addition to intestinal parasitism, the most common causes of acute, large bowel diarrhea are diet change and dietary indiscretion.<sup>15,22</sup>

**Drugs/Toxins:** Certain drugs and toxins can incite acute diarrhea that reflects generalized intestinal inflammation. Commonly implicated medications include antibiotics, corticosteroids, chemotherapeutic agents, and nonsteroidal anti-inflammatory drugs (NSAIDs).<sup>3,4</sup> Heavy metals (e.g. lead) can also cause acute diarrhea.<sup>4</sup>

**Stress:** Stress from travel, boarding, hospitalization, surgery, and environmental changes may cause inflammation that is primarily large bowel (i.e. acute colitis) in origin.<sup>3,4</sup>

**Other Gastrointestinal (GI) Disorders:** Virtually any GI disease can cause diarrhea. Examples include intussusception, acute hemorrhagic diarrhea syndrome, intestinal obstruction, inflammatory bowel disease, and intestinal neoplasia.<sup>3-6,15,16</sup>

**Other Disorders:** Diseases of other organs that can result in diarrhea include acute kidney injury, acute hepatitis, various pancreatic diseases, hyperthyroidism, and hypoadrenocorticism.<sup>3-6</sup>

### Pathophysiology

Pathophysiologic changes associated with small or large bowel diarrhea are primarily explained by the anatomic differences and physiologic roles of each section of bowel.<sup>14,15</sup> Four primary mechanisms of diarrhea can occur, as described below:

1) With **osmotic diarrhea**, osmotically active particles (e.g. nutrients) are retained in the intestinal lumen that are not digested or properly absorbed. This retention leads to carbohydrate fermentation and bacterial overgrowth, diarrhea, and the additional increased presence of osmotically active particles.<sup>3,6</sup>

2) **Secretory diarrhea** most commonly occurs secondary to infectious diarrhea or bacterial overgrowth. Stimulation of crypt enterocytes leads to increased fluid in the intestinal lumen. Note that enterotoxins can also be associated with infectious agents that further lead to acute diarrhea.<sup>3,6</sup>

3) **Increased mucosal permeability** occurs with erosive, ulcerative, and inflammatory processes. Fluid, electrolytes, protein, and blood escape into the intestinal lumen.<sup>6</sup>

4) **Altered intestinal motility** can occur with inflammatory processes. Cytokines affect smooth muscle function. Inflammation stimulates massive contractions of the intestines. These powerful contractions propel intestinal contents faster than normal contractions, resulting in abdominal cramping and increased urgency of defecation.<sup>1</sup> Inflammatory mediators can also contribute to mucosal barrier breakdown, which leads to decreased absorption of nutrients and electrolyte loss.<sup>3</sup>

Patients with acute diarrhea may also experience dysbiosis of the intestinal tract. Dysbiosis is microbial imbalance of GI flora. Dysbiosis can contribute to enteritis, colitis, maldigestion, malabsorption, and food intolerance.<sup>5,7</sup> Significantly lower bacterial diversity has been noted in dogs with acute diarrhea compared to healthy controls.<sup>7</sup>

### Diagnosis

In stable patients with mild systemic signs of acute enterocolitis, it is reasonable to limit diagnostic tests to a history, physical examination, and fecal evaluation for intestinal parasites. If the patient fails to respond to therapy or the clinical signs worsen, then further tests are indicated.<sup>1-6,14</sup>

**Physical Examination Findings/History:** It is important to differentiate small bowel from large bowel diarrhea (**Table**).<sup>14,15</sup> Patients with large bowel diarrhea typically exhibit tenesmus, dyschezia, hematochezia, mucus-covered feces, increased frequency, and increased urgency of defecation. Findings associated with small bowel diarrhea include melena, increased volume of feces per defecation, and often normal frequency and urgency of defecation.<sup>6,14</sup>

Findings	Small Bowel Diarrhea	Large Bowel Diarrhea
Weight loss	Possible	Uncommon
Appetite	Decreased	Normal
Vomiting	Possible	Uncommon
Abdominal Pain	Possible	Possible
Flatulence	Possible	Uncommon
Defecation Frequency	Normal to Mild Increase	Increased
Urgency	Normal	Increased
Fecal Volume	Increased	Normal

Tenesmus	Absent	Present
Mucoid Feces	Absent	Present
Hematochezia	Absent	Present
Melena	Possible	Absent
Steatorrhea	Possible	Absent

Other findings may include fever, dehydration, weight loss, dry and/or pale mucous membranes, prolonged capillary refill time, and vomiting. Abdominal palpation may reveal pain, dilated loops of intestines, and/or an intestinal mass. Findings vary in severity. Some patients with acute diarrhea can be normal on physical exam. Animals with severe small bowel diarrhea may develop hypovolemic shock. Other findings depend on the underlying cause of enterocolitis.<sup>1,3,6,14</sup>

Rectal examination is recommended. Pain, tenesmus, blood, mucous, obstruction, and/or foreign material may be noted.<sup>3,14,16</sup>

**Complete Blood Count:** Results are usually normal with mild cases. Hemoconcentration may occur with dehydration. Anemia can develop with severe intestinal blood loss. Other abnormalities may be present secondary to the underlying cause.<sup>1,5,6</sup>

**Biochemistry Profile:** Findings may be nonspecific or normal with mild, acute diarrhea. Possible abnormalities with moderate to severe diarrhea (especially small bowel) include hypoalbuminemia, hypokalemia, hyponatremia, hypochloremia, and metabolic acidosis. Prerenal azotemia may occur with dehydration. Other laboratory changes are dependent on the underlying cause.<sup>1,5,6,21</sup>

**Fecal Examination:** Fecal tests (e.g. fecal flotation, fecal smear cytology) are recommended to evaluate for intestinal parasitic and protozoal infections.<sup>1,3,6</sup> Fecal cytology may demonstrate inflammatory cells (e.g. neutrophils) suggestive of bacterial disease. Note that clostridial spores (**Figure**) can be seen in normal and abnormal specimens, so their presence is not diagnostic of enterotoxin.<sup>16</sup>

**Enteric Pathogen Tests:** Testing for infectious enteric pathogens can be performed, but results may be misleading. For example, *C. difficile*, *C. perfringens*, *E. coli*, *Campylobacter* spp., and *Salmonella* spp. can be isolated from both healthy and diarrheic animals.<sup>1,4,8</sup> Fecal culture, fecal antigen tests, polymerase chain reaction (PCR) assays, and enterotoxin assays are all available.<sup>1,3,5,6,16</sup> Testing for enteropathogens can be considered in cases of acute, hemorrhagic diarrhea; for diarrheal outbreaks in multi-pet environments; and in cases where zoonotic transmission is suspected.<sup>5</sup>

**Radiography:** Survey and contrast radiographs are primarily useful for detecting mechanical issues, such as masses, foreign bodies, and causes of obstruction.<sup>14</sup>

**Ultrasonography:** Abdominal ultrasonography can be used to evaluate for an intussusception, mass, foreign body, lymphadenopathy, and structural intestinal changes, such as abnormal intestinal wall thickness, echogenicity, dilation, and layering/wall separation.<sup>14,20</sup>

**Endoscopy:** Depending on the type of diarrhea, upper GI endoscopy, ileocolonoscopy, or proctoscopy may be useful for visualization of abnormalities and obtaining biopsy specimens.<sup>1-6,19</sup>

**Other Tests:** Other tests to consider include rectal cytology; retroviral tests in cats; thyroid hormone assessment (especially in cats); screening for hypoadrenocorticism (especially in dogs); and pancreatic assays (i.e. pancreatic lipase immunoreactivity [PLI], trypsin-like immunoreactivity [TLI]).<sup>1-6</sup> While TLI is the test of choice for exocrine pancreatic insufficiency, PLI results for pancreatitis should be correlated with abdominal ultrasound findings. Folate and cobalamin levels may also be useful but are more relevant during chronic disease and should always be assessed together with the TL.<sup>17</sup>

## ● Disease Description in This Species

### Signalment

Acute enterocolitis with acute diarrhea is common. Any age, sex, or breed can be affected.

## Clinical Signs

Clinical signs may include tenesmus, hematochezia, mucoid feces, melena, increased frequency of defecation, increased urgency of defecation, abdominal cramping, abdominal pain, dehydration, depression, vomiting, prolonged capillary refill time, dry or pale mucous membranes, and hypovolemia.<sup>1-6</sup>

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## ● Etiology

Adenocarcinoma  
Ancylostoma braziliense  
Ancylostoma caninum  
Ancylostoma ceylanicum  
Ancylostoma spp.  
Antibiotics  
Bacterial infection  
Balantidium coli  
Campylobacter jejuni  
Canine adenovirus-1 (CAV-1)  
Canine adenovirus-2 (CAV-2)  
Canine coronavirus  
Canine distemper virus  
Canine parvovirus type-2  
Canine reovirus  
Carprofen  
Chemotherapy  
Clostridium difficile  
Clostridium perfringens  
Clostridium spp.  
Corticosteroid administration  
Cryptosporidium canis  
Diet  
Dietary indiscretion  
Dipylidium caninum  
Drug reaction  
Drugs  
Escherichia coli  
Food allergy  
Foreign body  
Fungi  
Gastrointestinal obstruction  
Giardia duodenalis (intestinalis, lamblia)  
Heavy metal poisoning  
Hepatic disease  
Histoplasma capsulatum  
Hyperthyroidism  
Hypoadrenocorticism  
Ibuprofen  
Idiopathic, unknown  
Infectious diseases  
Inflammatory bowel disease  
Intestinal parasites  
Intussusception  
Isospora/Cystoisospora burrowsi  
Isospora/Cystoisospora canis  
Isospora/Cystoisospora neorivolta  
Isospora/Cystoisospora ohioensis  
Isospora/Cystoisospora spp.  
Lead poisoning  
Lymphoma, lymphosarcoma

Neoplasia  
Nonsteroidal anti-inflammatory drug  
Pancreatic exocrine insufficiency  
Pancreatitis  
Poisonous plants  
Prototheca zopfii  
Protozoa  
Pythium insidiosum  
Renal failure  
Rotavirus  
Salmonella spp.  
Stress  
Surgery  
Taenia spp.  
Toxascaris leonina  
Toxins  
Toxocara canis  
Trichuris vulpis  
Uncinaria stenocephala  
Yersinia enterocolitica  
Yersinia pseudotuberculosis

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### ● Breed Predilection

None

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### ● Sex Predilection

None

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### ● Age Predilection

None

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### ● Clinical Findings

Abdominal pain  
AFEBRILE  
Anorexia, hyporexia  
Borborygmus  
Capillary refill time prolonged, >2 seconds  
Defecation inappropriate  
Dehydration  
Depression, lethargy  
DIARRHEA  
Dyschezia, defecation painful  
Exercise intolerant, reluctant to move  
Feces mucus covered, mucoid  
Feces rancid, foul odor  
FEVER  
Flatus, flatulence  
Hematochezia  
HEMORRHAGE  
MASS  
Melena  
Mucous membranes pale  
Nausea  
PAIN  
Shock  
TENESMUS  
VOMITING  
Weakness: Asthenia or Paresis  
ZZZ INDEX ZZZ

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## Diagnostic Procedures

### Diagnostic Procedures:

Complete blood count (hemogram)

### Diagnostic Results:

ANEMIA

Hemoconcentration or polycythemia

Leukocytosis

Leukopenia

Radiography of abdomen

Foreign body visualized

Intestinal, bowel loops fluid filled

Intestinal, bowel loops gas distended

Intestinal, bowel loops thickened

ELISA assay on fresh feces

ELISA positive for specific pathogen

Giardia ELISA assay positive

Positive for rotavirus antigen

Fecal examination/flotation

Ascarid eggs in feces

Cryptosporidium spp. oocysts identified

Double-operculated eggs in fecal floatation

Hookworm ova in smear or flotation

Parasites observed in flotation or smear

Taeniid ova or proglottids

Tapeworm ova identified

Trichuris vulpis eggs in fecal floatation

Fecal flotation with zinc sulfate

Cystoisospora (Isospora) oocysts observed in feces

Giardia cysts present

Serology for specific disease

Coronavirus serology positive

Histoplasma antigen test positive

Pythiosis ELISA assay positive

Serology positive for specific disease

Serum biochemistries

Azotemia/uremia

Blood urea nitrogen (BUN) increased

Creatinine increased

Hypoalbuminemia

Hypochloremia

Hypokalemia

Hyponatremia

Ultrasonography of abdomen

Abdominal mass internal

Intussusception

Neoplasia, tumor

Radiography, contrast procedure

Gastrointestinal obstruction

Fecal smear and/or sedimentation

Giardia trophozoites present in feces or duodenal contents

Fecal smears stained

Amebic trophozoites identified

Campylobacter like organism identified

Leukocytes in feces

Trichomonads identified in feces

Endoscopy of colon/rectum

Colonic ulceration

Mucosal enteritis

Rectal foreign body visualized

## Rectal inflammation Typhlitis

PCR assay on feces, fluid, tissue

Campylobacter detected by PCR  
Hookworm species detected by PCR  
Positive for coronavirus  
Tapeworm DNA detected by PCR

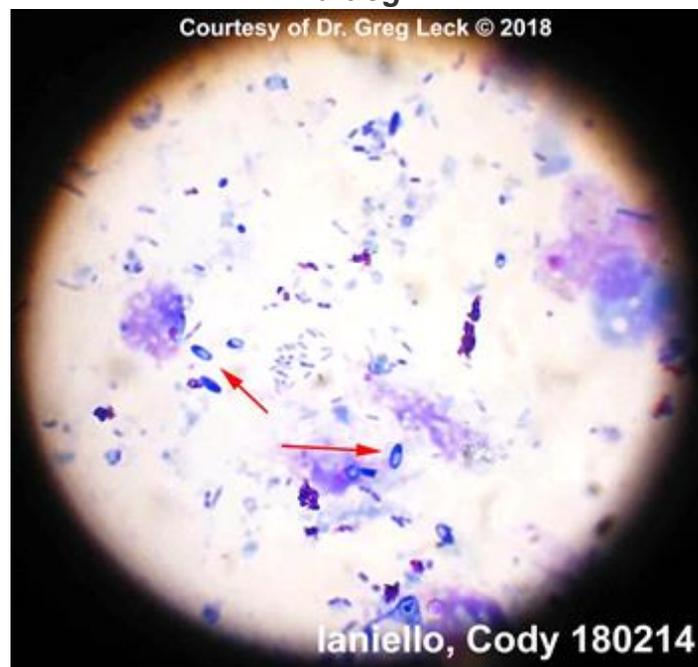
PCR assay

Canine distemper virus detected by PCR  
CAV-1 detected by PCR  
Prototheca spp. detected by PCR  
Salmonella detected by PCR

## Images

*Click on image to see a larger view*

**Figure. Possible clostridia on fecal smear in a dog**



Fecal smear, DiffQuik stain. Arrows point to spore-forming bacteria consistent with clostridia, although other spore-forming bacteria are also possible. [Click here to see board discussion](#)

## Treatment / Management

### **SPECIFIC THERAPY**

Treat the specific underlying cause of the diarrhea if possible.

### **SUPPORTIVE THERAPY**

Patients with mild enterocolitis can be treated supportively. Anthelmintics, dietary therapy, and/or probiotic use is common. Many cases of mild enterocolitis resolve within a few days after starting supportive therapy. Patients with more severe signs may require hospitalization for supportive care.<sup>3</sup>

**Anthelmintics:** Broad-spectrum anthelmintics are often recommended regardless of fecal examination results because of the potential for intermittent shedding of ova. Fenbendazole is often given at 50 mg/kg PO q 24 hrs for 3 days then repeated in 3 weeks and possibly again in 3 months.<sup>1</sup>

**Dietary Therapy:** Highly-digestible diets that are low in fat are reasonable first choices. Diets that have a single source for carbohydrates are more digestible than diets with multiple carbohydrate sources.<sup>5,6</sup> Such prescription diets include Hill's i/d®, Purina EN®, and Royal Canin Intestinal®.<sup>1,6,9</sup> Other options include boiled, skinless chicken or boiled ground turkey, boiled rice or potatoes, and low-fat cottage cheese. Gradual transition back to the regular diet can usually begin after 3-5 days.<sup>3</sup>

**Fiber Supplementation:** Adding soluble fiber to the diet (e.g. psyllium at 1-4 teaspoons mixed with food PO q 12-24 hrs) can be beneficial. Soluble fiber helps to improve the consistency of feces; stabilizes colonic motility; and alters colonic bacterial metabolism.<sup>1</sup>

**Probiotics/Prebiotics:** Probiotics are live microorganisms that help maintain GI health. Benefits of probiotics include increasing the ratio of normal, healthy microbes to pathogenic species; increasing competition against pathogenic bacteria; decreasing bacterial translocation; and producing antimicrobial products. Prebiotics are complex carbohydrates (e.g. fructo-oligosaccharides, lactulose, manno-oligosaccharides, lactosucrose) that increase the growth of beneficial intestinal bacteria and improve barrier function. Prebiotics help with establishment of probiotics.<sup>10</sup> When prebiotics and probiotics are combined together, they are sometimes referred to as *synbiotics*.<sup>13</sup> Some studies have shown that probiotics can help reduce the duration and severity of diarrhea in dogs and cats.<sup>5,11</sup>

**Antibiotics:** Use of antibiotics for acute, uncomplicated cases of diarrhea is controversial, especially because acute diarrhea is often self-limiting.<sup>4,5</sup> Indiscriminate administration can lead to adverse effects, such as exacerbation of diarrhea; alterations in normal GI flora; and antibiotic resistance.<sup>5</sup> Metronidazole is sometimes prescribed because it has antimicrobial, immunomodulatory, and anti-inflammatory effects. However, in one study of dogs with acute diarrhea, no significant difference in time to resolution of diarrhea was noted between dogs treated with metronidazole and those treated with placebo.<sup>12</sup> Tylosin at 10-20 mg/kg PO q 12 hrs in food may be beneficial for some cases of acute colitis. Other antibiotics can be considered in patients that are systemically ill (e.g. fever, neutrophilia, inflammatory leukogram), have sepsis, or are immunocompromised.<sup>4</sup>

**Motility Modifiers:** The use of motility modifiers is controversial. Loperamide (0.1-0.2 mg/kg PO q 6-12 hrs for 24-48 hours) and diphenoxylate (0.05-0.1 mg/kg PO q 6-12 hrs for 24-48 hours) increase fluid absorption and decrease secretion in the intestinal tract. They also increase colonic segmentation and decrease propulsive peristaltic contractions. Avoid use of motility modifiers in patients with enterotoxin-associated diarrhea because they may delay removal of toxins. Motility modifiers are also not recommended if GI obstruction is present.<sup>3,6</sup>

**Fluid Therapy:** Patients with mild, acute diarrhea may benefit from subcutaneous fluid therapy. Patients with moderate to severe diarrhea and significant dehydration may require more intensive fluid therapy.<sup>6</sup>

**Antiemetics:** Treat vomiting as needed with appropriate antiemetic therapy.

## MONITORING

Monitor for resolution of clinical signs.<sup>3,6</sup> Patients with severe, acute enterocolitis may require hospitalization and extensive monitoring. Vital parameters, laboratory abnormalities, and hydration status are assessed repeatedly.<sup>3</sup> Patients with recurrent episodes of enterocolitis may warrant further diagnostic tests to determine the underlying cause. Some patients eventually develop chronic enterocolitis, requiring therapy specific to the underlying cause.

## PROGNOSIS

Acute, mild enterocolitis typically resolves within a few days with appropriate treatment and supportive care. Prognosis for moderate to severe enterocolitis varies depending on the underlying cause and response to therapy.<sup>3,6,17</sup>

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## Special Considerations

### Other Resources

Recent VIN Message Board discussions on [acute enteritis](#)

Recent VIN Message Board discussions on [acute colitis](#)

Recent VIN Message Board discussions on [acute small bowel diarrhea](#)

Recent VIN Message Board discussions on [acute large bowel diarrhea](#)

[Canine Therapeutic Diet Comparison Chart](#)

Client Handout on [irritable bowel syndrome in dogs](#)

Client Handout on [colitis](#)

BestBETS for Vets: [Use of Metronidazole in Dogs with Acute Diarrhea](#)

Common Small Animal Diagnoses: An Algorithmic Approach, Section 7: [Acute Large Intestinal Diarrhea](#)

Common Small Animal Diagnoses: An Algorithmic Approach, Section 7: [Acute Small Intestinal Diarrhea](#)

Common Small Animal Diagnoses: An Algorithmic Approach, Section 7: [Hematochezia](#)

Proceedings articles that discuss [acute enterocolitis](#), [acute diarrhea](#)

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## ● Differential Diagnosis

[Acute hemorrhagic diarrhea syndrome](#)

[Acute kidney injury](#)

[Campylobacteriosis](#)

[Clostridial enteritis](#)

[Coccidiosis](#)

[Cryptosporidiosis](#)

[Enteric coronavirus](#)

[Exocrine pancreatic insufficiency](#)

[Giardiasis](#)

[Hepatic disease](#)

[Hookworm infection](#)

[Hypoadrenocorticism](#)

[Intestinal obstruction](#)

[Intussusception](#)

[Pancreatitis](#)

[Parvovirus](#)

[Pseudomembranous colitis](#)

[Rotavirus](#)

[Roundworm infection](#)

[Salmonellosis](#)

[Trichuriasis](#)

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