

Clostridial Colitis

Clostridial colitis (AKA enterocolitis) is a specific type of large bowel inflammation in equines caused by bacterial infection with clostridial species, most commonly *Clostridium difficile* or *Clostridium perfringens*. It is thought that [undiagnosed clostridial colitis](#) makes up a significant segment of general “colitis-X,” and the presentation of the two are virtually identical. Because of the extremely high mortality rate associated with all forms of colitis in horses (rates between 50 and 100 percent are reported clinically and anecdotally), early diagnosis and intervention are vital.

This article examines the risk factors for clostridial colitis, as well its signs and symptoms, clinical progression, diagnosis, treatment, and most importantly, prevention.

General Presentation of Early Clostridial Colitis

Clostridial infection may be new or may exist subclinically until risk factors (see below) upset the delicate balance of hindgut flora. Clostridial colitis presents in horses in the same manner of all cecum and colon inflammation. Symptoms may have a rapid onset, including:

- lethargy or depressed affect
- individual behaviors associated with pain
- watery diarrhea
- mucous in the stool
- frank blood in the stool
- reduced intake of feed
- refusal to eat and drink
- refusal of foals to nurse
- colic
- fever

Clinical Progression of Clostridial Colitis

Colitis resulting from clostridial infection typically progresses very quickly. Diarrhea and diminished water consumption result in fluid loss and severe dehydration. Dehydration, in turn, produces pain and ultimately hypovolemic shock, with rapid

heartbeat and a precipitous drop in body temperature. If left untreated, the horse will expire, often within a day or two.

Clostridial colitis, even when successfully treated later in its progression, may result in other sequelae that need to be addressed as well. Translocation of bacteria via mucous across the entire GI tract may cause bacteremia and toxemia affecting other bodily organs. Colitis, in general, is also a not uncommon cause of laminitis, due to the presence of gut microbes in the bloodstream spreading to the distal extremities.

Risk Factors for Clostridial Colitis

Clostridial colitis shares risk factors with nonspecific colitis, including stress and transport and may develop from subclinical presence to overt presentation with minimal provocation. There are numerous other risk factors.

- Prior treatment with antibiotics: all antibiotics are known to potentially change the balance of hindgut flora. However, [certain antimicrobials](#) are now associated with the proliferation of clostridial species, including rifampicin (AKA rifampin), erythromycin, and the fluoroquinolone class, resistance to which is well studied and a contributor to a major [human outbreak of fatal *Clostridium difficile*](#) in Canada.
- Food deprivation: associated with illness, poor keeping, transport, reduced turnout time, show schedules, racetrack competition, etc.
- Newborn foals: virtually all newborn foals shed clostridial bacteria in their feces within the first three days of life (one study found [one in three had *C. difficile*](#)), so they are likely present in the GI system at birth but may overgrow due to external factors.
- Improper hygiene: clostridial spores are notoriously difficult to remove from the environment and are easily transmitted to equines via equipment, equine-to-equine contact, and human contact.
- Surgery: the surgical and post-operative period can pose a quadruple threat with stress, withdrawal of food, antibiotic use, and nosocomial exposure to *Clostridium* bacteria.

Additionally, the overuse of proton pump inhibitors (PPIs) has been postulated as [another potential risk factor](#) for the overgrowth of *Clostridium difficile* resulting in colitis in equines, based on [human studies](#) potentially connecting PPIs with *C. difficile* vulnerability due to reduced gastric acidity.

Diagnosis of Clostridial Colitis

Immediate diagnosis is imperative if a horse is to survive a bout of clostridial colitis. Fresh fecal samples should be examined for the presence of *Clostridium difficile* and *Clostridium perfringens*, both for proportions of these bacteria as well as for specific strains associated with toxicity and virulence.

Fecal samples shipped for laboratory assessment should be chilled, not frozen, and maintained in an anaerobic environment, in transit and in the lab. Communication with the laboratory in advance is advised.

In the absence of fecal samples, samples of reflux, intestinal contents, or tissue samples may be utilized. If an outbreak of clostridial colitis is suspected in a barn with multiple horses, immediate necropsy of any deceased animals is suggested.

In cases of suspected or confirmed clostridial colitis, blood cultures should be obtained to rule in or rule out bacteremia and to monitor or prevent the spread of pathogens to other systems.

A fecal blood test is also advised, as occult blood may be present as part of the infective process. For a more comprehensive assessment of GI injury, the [SUCCEED Equine Fecal Blood Test](#) is not only highly sensitive (95-97%) to ulceration of the colon, it also detects the presence of albumin in feces. Since albumin is broken down in the duodenum, it can then be assumed that any fecal albumin originates from injury caudal to the common bile duct, helping to distinguish foregut from hindgut ulceration.

It should be noted that the presence of a clostridial infection is not mutually exclusive to other GI injury; in fact, GI comorbidities may participate in the overgrowth of native clostridial species and may facilitate the entrance of clostridial bacteria into the bloodstream for further complications.

Treatment of Clostridial Colitis

Treatment for nonspecific colitis can be commenced while awaiting lab results to confirm the presence of a clostridial infection. Intravenous fluids and electrolyte replacement should take place as soon as possible. Parenteral nutrition may need to be administered. In the case of foals, they may need to be separated from the mare and withdrawn from milk.

Blood plasma or synthetic colloids may also need to be infused, in addition to corticosteroids to counteract shock in advanced cases.

Administration of [flunixin meglumine](#) at 0.25 to 1.1 mg/kg can help fight toxemia, and this can also relieve pain in the digestive tract. Polymyxin B is another agent of choice to bind endotoxin at [5,000 units/kg](#). Additionally, *Saccaromyces boulardii* (yeast) is known to produce a protease that breaks down both A and B toxic strains of *Clostridium difficile* and [survives in the horse gut](#). [DTO \(di-tri-octahedral\) smectite powder](#) may also bind toxins and reduce diarrhea.

When clostridial infection is confirmed, the standard of care is [metronidazole 15-20 mg/kg, PO, three to four times daily](#). In areas where metronidazole resistance has been noted or when susceptibility testing indicates, treatment with vancomycin may be an alternative. If bacterial translocation is a concern, or if the horse is leukopenic, a more broad spectrum antibiotic may need to be administered concurrently.

Research is ongoing in the effectiveness of [inducing digital hypothermia](#) (icing of the feet) as a prophylactic measure in horses prone to laminitis or where colitis-associated laminitis is a potential concern.

Prevention of Clostridial Colitis

Given the rapid onset and virulence of clostridial colitis, prevention is of paramount importance. There is currently no immunization available against clostridial pathogens, although in barns with historically large outbreaks of clostridial colitis, off-label [vaccination of pregnant mares](#) with *Clostridium perfringens* C and D toxoid one month prior to foaling and giving the antitoxin orally to newborn foals has proven effective.

In foals born to healthy mares, ingestion of colostrum within an hour of birth has been shown to also reduce early infection with clostridial species.

Isolation of any animals infected with *Clostridium* bacteria is essential to prevent spread of the spores within the barn. All vectors of contact must be addressed. Humans who travel between the animals should not rely on alcohol-based hand sanitizers, nor should alcohol-based sprays be depended on to clean the environment. [Soap and water or chlohexidine cleansing is the gold standard](#), including the tail, udder, and hindlegs of any mares immediately after foaling.

In general, antibiotics should be administered judiciously, so as not to hasten resistance and not to upset the natural balance of hindgut flora.

Food deprivation should be minimized, and all stressors to the horse—and indirectly to the horse's GI system—should be evaluated to prevent both nonspecific and clostridial colitis.