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Clostridium Enterocolitis

Clostridium perfringens Types A and C and *Clostridium difficile* have the potential to cause enterocolitis or inflammation of the small and large intestine in neonatal foals. Types A and C produce α -toxin and type C can also produce β -toxin.

The source of infection for the foal may be a carrier horse (possibly the mare) shedding the organism in feces or exposure to bacteria in the environment. Examples of environmental exposure include organisms on the udder or body of the mare or organisms in the foaling stall, stable, paddock, water bucket or feeding trough.

Clostridium perfringens Type A is commonly found in the environment of horse farms, whereas Type C is less commonly isolated. In one study, more than 60 % of foals 8 to 12 hours of age and more than 90 % of foals 3 days old had *Clostridium perfringens* in their feces. It was noted that *Clostridium perfringens* Type A appears to be a normal inhabitant of the gastrointestinal tract of neonatal foals. It is not known why some foals develop enterocolitis due to *Clostridium perfringens* and other foals do not. Infection with *Clostridium perfringens* Type A with the β_2 or enterotoxin gene or Type C is more likely to be associated with clinical disease.

Neonatal foals of any breed can be affected, but stock-horse breeds have the highest risk of development of *Clostridium perfringens* enterocolitis. Other factors associated with an increased risk include current or historical presence of other species of livestock on the premises, presence of a floor type in the foaling area that is difficult to clean (i.e. dirt, sand or gravel), and high milk production by the mare.

Clinical disease may affect one or two foals on a farm or occur as an outbreak in multiple foals. *Clostridium* is not considered to be contagious from foal to foal. The route of exposure or uptake by the foal is oral as the young foal nurses and explores its environment.

Clinical signs of *Clostridium* enterotoxemia include severe abdominal pain or colic, foul smelling and sometimes bloody diarrhea, dehydration, depression, abdominal distention and/or rapid death. The organism and associated toxins cause severe damage to the mucosa and villi lining the small and large intestine.

Affected foals appear healthy at birth and usually have adequate passive transfer of colostral antibodies. The disease typically occurs within the first week of life, is rapidly progressive and associated with a high mortality rate.

Confirmation of a diagnosis of *Clostridium perfringens* infection in foals with enterocolitis is based on anaerobic culture of fecal samples, with further typing of any isolated *Clostridium* bacteria, identification of specific bacterial toxins in feces and other diagnostic tests. Evaluation of blood



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parameters may reveal a low white blood cell count, elevated fibrinogen, and low blood protein levels.

Intensive medical treatment is often necessary to save the life of clinically affected foals. Treatment may include intravenous fluid support, antibiotic therapy (i.e. penicillin and metronidazole), oral administration of *Clostridium perfringens* type C and D antitoxin or plasma, intravenous administration of anti-clostridial hyperimmune plasma, administration of a toxin adsorbant (Bio-Sponge®) and other medications. In severe cases the foal may need to be fed intravenously and milk withheld.

Preventive measures that may be instituted on farms with a history of neonatal infections with *Clostridium perfringens* include vaccination of mares prior to foaling, thorough cleaning and disinfection of stalls between foalings, washing the udder of the mare before the foal suckles for the first time, and prophylactic administration of specific antibiotics for the first few days of life and oral *Clostridium perfringens* Type C and D antitoxin. It may also be beneficial to administer a non-specific intestinal adsorbent (i.e. Bio-Sponge®) beginning at 12 hours of age.

Unfortunately, there are no vaccines against *Clostridium perfringens* organisms or their toxins labeled and approved for use in the horse. There is some evidence that immune protection for a newborn foal may be gained by vaccination of the mare 6 weeks and again at 3 weeks prior to the due date with a *Clostridium* toxoid vaccine approved for other livestock. This will hopefully induce formation of antibodies against *Clostridium* toxins that will be transferred to the foal through colostrum.

The goals for prevention of clinical disease would be to limit or eliminate potential exposure, prevent colonization of the organisms in the intestinal tract if ingested, and to prevent the bioactivity of toxins produced if organisms are present in the intestinal tract.

Clostridium enterocolitis is a sporadic disease and is a known killer of neonatal foals. A *Clostridium* preventive plan is recommended for equine breeding farms or ranches with a history of neonatal foal deaths due to *Clostridium* and should be considered for breeding farms that currently or historically housed cattle.

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