

Botulism

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Abstract

Botulism is caused by *Clostridium botulinum*. *C. botulinum* is an obligate anaerobe, meaning its spores only germinate and subsequently produce toxin in absence of oxygen. This toxins affects neurons, which are the cells that make up nerves. These cells form a chain, with a signal passing from cell to cell to produce a muscle contraction. The *C. botulinum* toxin binds to a neuron and blocks the release of one of the signaling molecules so the signal cannot reach the next cell in the chain. Without a signal to contract, the muscles become soft, producing a flaccid paralysis. Though not as common in New England as in the mid-Atlantic and West Coast states, botulism can affect both horses and donkeys

Pathophysiology

In foals, typically infection occurs when spores are ingested. These spores germinate in the gastrointestinal tract and release the neurotoxin into systemic circulation. This is called “toxicoinfectious botulism.” In adult horses, botulism most commonly occurs as a result of ingesting preformed toxin in forage. Round bales, for example, are so large and dense that the interior of the bale does not get exposure to oxygen, which allows the spores to germinate and produce toxin. Horses then munching on the round bale ingest the toxin and become ill.

Clinical Signs and Diagnosis

Flaccid paralysis can manifest as generalized weakness, trembling, and sweating. Your horse may appear to lie down more frequently and progress to complete recumbency. Affected horses will also have difficulty swallowing. Eyelids may appear droopy and pupils may be dilated. The tongue may also be easily pulled out of the mouth.

Diagnosis

Diagnosis is typically based on clinical signs and geographic location. A blood test cannot diagnose botulism but your vet may perform a grain test. This test evaluates how quickly a horse can eat 1 cup of grain. Longer than 2 minutes indicates difficulty prehending food, such as in botulism but botulism is not the only condition that can cause a prolonged grain test.

Treatment

Botulism antitoxin is available and should be administered by your veterinarian as soon as possible in suspected cases. Be warned, however, that antitoxin is very expensive. Your veterinarian will also most likely have to acquire antitoxin from an academic veterinary hospital. Because botulism often affects swallowing, your veterinarian will also likely pass a nasogastric tube so water and food can be administered. Broad-spectrum antibiotics help prevent secondary complications such as aspiration pneumonia stemming from an impaired swallowing mechanism and infected pressure sores from being down.

Supportive care is also important. Provide a quiet stall with extra bedding and good ventilation. Minimize stress and remove hay and water. Do not force affected animals to stand. If they do prefer to stand, stack shavings bags or hay bales so they can rest their head. If recumbent, try to turn the horse every 2 to 4 hours to minimize further muscle damage.

Prognosis

Antitoxin will only bind circulating toxin. It has no effect on toxin that is already bound to the neuron. Foals that remain standing or foals that are recumbent without respiratory distress who receive anti-toxin and good supportive care have a good prognosis. Adults that remain standing can have a fair to good prognosis and sometimes can pull through without receiving anti-toxin. Foals with respiratory distress and recumbent adults have a poor prognosis, despite anti-toxin and hospital treatment.

A vaccine against botulism is available but three doses must be administered at the appropriate intervals to be protective. If you feed round bales or anticipate spending a lot of time in New Jersey or Pennsylvania, talk to your veterinarian about whether your horse may be a candidate for the vaccine.