

# Botulism still a threat to horse health

*Botulism remains a threat to the health of horses, but sound management practices and careful feed selection will go a long way in preventing the disease.*

By **BRYAN WALDRIDGE\***

**B**OTULISM is caused by toxins produced by the Gram-positive anaerobe *Clostridium botulinum*, a spore-forming bacterium commonly found in soils.

Botulism toxin is one of the most potent biological toxins known, and horses are probably the most susceptible species because just 1 mg of toxin can kill an adult horse.

Three types of botulism are recognized in horses. Adult horses usually ingest toxins produced by the bacteria in feedstuffs (sometimes referred to as forage poisoning). For years, it was thought that forage poisoning occurred from consuming fragments of an animal carcass (for example, from dead rodents), particularly in baled hay, but it is now acknowledged that horses can also pick up the toxins when they eat hay that has been trampled. Improperly ensiled haylage is also often associated with equine cases of botulism.

In the second type, foals usually ingest *C. botulinum* bacteria that multiply in the gut and then produce toxins (toxicoinfectious botulism).

The third type, wound botulism, is uncommon and results from *C. botulinum*-contaminated surgical or traumatic wounds, injection sites, punctures or castration incisions.

From a nutritional perspective, the most significant type of botulism is the type caused by ingested toxins from tainted feedstuffs.

Important clinical signs of botulism are weakness and difficulty eating or swallowing. Botulism causes weakness because its toxins prevent the release of

acetylcholine from nerves, which signals the muscles to contract.

Affected foals are often unable to stand for very long and shake due to muscle weakness when they try to remain standing or even when they lie down. These foals are said to have “shaker foal syndrome” and are typically affected between two and five weeks of age.

Adult horses sometimes appear to move in slow motion and can also have muscle shaking or difficulty walking. Severely affected horses are unable to stand on their own or raise their head and sometimes cannot stand even when assisted by a sling.

Physical examination usually will reveal a loss of tail and eyelid tone, with the tail easily raised or the eyelids kept open with minimal effort.

One simple test for botulism is the

“grain test” in which the horse is offered 8 oz. of grain. A normal horse should consume the grain within two minutes; horses with botulism cannot eat the grain normally or swallow. Affected horses will often try to eat the grain without using their lips.

Difficulty swallowing can be exhibited by saliva, occasionally mixed with grain, draining from the nostrils. The horse may be unable to retract its tongue. Reduced tongue tone and difficulty swallowing are often present before other clinical signs of botulism appear.

Death can occur due to complications of prolonged recumbency, aspiration pneumonia or respiratory failure. Unfortunately, there is no readily available or practical test for botulism in horses other than clinical signs in an area where botulism is known to occur.

## Treatment

Treatment for botulism is expensive and time consuming. Most affected horses need to be hospitalized because they require constant nursing and feeding care and may deteriorate to the point of



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needing a sling to stand.

A mainstay of therapy involves administration of botulism antitoxin, which binds the botulism toxin in circulation. However, once botulism toxin has bound to the nerve, it cannot be reversed, and the horse's body must regenerate its own nerve-muscle junctions, which can take weeks. Antibiotics such as penicillin and metronidazole can kill *C. botulinum* bacteria, if present.

Horses usually cannot swallow or drink, so they require intravenous fluids and feeding via stomach tube or total parenteral nutrition. The prevention of pressure sores through assistance with standing is also very important and can be labor intensive.

Foals occasionally have such severe respiratory weakness that they require assisted breathing with a mechanical ventilator. Death can occur even with aggressive treatment. Foals generally have a better prognosis than adult horses.

## Prevention

Prevention of botulism involves vaccination and sound feeding practices. Most cases of botulism in the U.S. are

caused by type B botulism, with fewer cases of types A and C.

The only commercially available vaccine against botulism is for type B. An initial series of three monthly vaccinations is recommended for unvaccinated horses, followed by yearly boosters.

Mares should have their vaccinations against botulism completed or boosted by the 10th month of pregnancy to allow some antibody to pass to the foal in colostrum. It is important to vaccinate mares in advance if they will be shipped to foal into an area where botulism is known to occur.

Hay growers and haylage manufacturers can help control botulism through stringent production methods. Recommendations include:

- Carefully rake crops to keep soil from becoming mixed with the hay.
- Avoid application of poultry manure to hay fields.
- Prevent delays in wrapping or bagging.

Hay that is known to contain animal carcasses should be completely disposed of and not fed to horses. Feeding hay off of the ground or over a pad to prevent trampling or contact with soil reduces the likelihood of contamination from botulism toxin in the environment,

especially when the ground is wet from rain or snow.

If haylage is fed, it should be purchased only from reliable manufacturers that guarantee good ensiling practices.

Several conditions must be present for the germination and growth of *C. botulinum* spores. Acidity is the primary factor. A pH near seven favors the growth of *C. botulinum*, while growth is generally inhibited at a pH of 4.6 or lower. These pH levels are dependent on various factors, including the percent dry matter of the haylage.

Though haylage and large round hay bales are usually implicated in cases of equine botulism, it is possible for the bacterium and toxins to be present in other forms of forage such as small square hay bales and hay cubes. Visual inspection of all forage is advised whenever possible, and suspect hay should be discarded well out of reach of horses.

Botulism remains a threat to the health of horses. Sound management practices and careful feed selection go a long way in preventing the disease, as do appropriate vaccination protocols. ■