



BOTULISM:

More Deadly than Wrinkles

By Megan Arszman

In Hollywood, botulism is a cosmetic quick-fix used to reduce lines and wrinkles and provide a youthful glow. But in your barn, botulism is much scarier than aging skin. It's a disease that can be very deadly and expensive to treat. In addition, there are many misconceptions: it's only a problem in Kentucky, it can only be found in round bales, and if a horse acquires botulism, human negligence must be involved. All of these presumptions are false.

The Neogen Corporation, based in Lansing, Mich., and Lexington, Ky., started a campaign to help educate horse owners across the country about this potentially deadly disease. The company wants to educate the equine community by explaining that botulism isn't always a disease of negligence. It's considered to be a silent killer, because it can often cause the death of an animal with no warning at all. When horse owners are afraid to share their stories, it makes research and education about the disease much more difficult.

continued on page 180

BOTULISM: MORE DEADLY THAN WRINKLES

continued from page 178



The BotVax B vaccination
Photo courtesy Neogen Corporation

What is Botulism?

Botulism is a progressive neuromuscular disease that quickly leads to weakness and flaccid paralysis or the lack of muscle tone with the reduced ability to move. It can be severe and typically leads to death if it's not treated soon after the onset of clinical signs. The disease is caused by toxins that have been produced by an anaerobic, spore-forming, soil-dwelling bacterium called *Clostridium botulinum*. There are three types (A, B, and C) that can affect horses, but 85 percent of the cases in North America are type B.

"The toxin can affect all mammals, but the horse is super, super sensitive," explains Bonnie Barr, VMD, Dipl. ACVIM, of Rood & Riddle Equine Hospital in Lexington, Ky. "Pretty much, the amount of toxin that can be on the tip of a pencil can make a horse recumbent, unable get up, and eventually die."

There are three different ways a horse can contract botulism. The first, and probably most common, is via forage poisoning. Intoxication occurs when a horse ingests preformed toxin from contaminated feed. Preformed toxin can be found in any feed, but it is most commonly found in improperly made or stored forages (e.g., round or square hay bales, hay cubes, etc.) or in food contaminated with animal carcasses containing *C. botulinum*. If *C. botulinum* establishes infection in a wound (such as umbilical infections, castration sites, puncture wounds, and injection site abscesses), wound botulism occurs. Finally, younger horses can contract botulism. Soil-borne *C. botulinum* spores are ingested by the foal, and they infect the gastrointestinal tract. Toxicoinfectious botulism, or shaker foal syndrome, can affect foals from a few days old to several months of age.

Deciphering the Clinical Signs

Clinical signs resulting from botulism poisoning can resemble those of a horse suffering from a severe bout of colic. If the

horse isn't treated quickly, the situation can go downhill rather quickly.

Typically, clinical signs of botulism are observed within 24 hours of exposure to the toxin, or as little as 12 hours. "The most common sign is an overall weakness," points out Dr. Barr. "A horse with botulism will be dysphasic and unable to swallow. If you pull a horse's tongue out the side of his mouth, a normal horse will be able to pull it right back in, but a horse with botulism can't. They can't get their tongue back in their mouth. You'll see a loss in eyelid tone. With a normal horse, if you go up to him and try to pull up his eyelid, his eyelid tone is going to make it difficult for you to do that. But, it's easy to do with a horse with botulism. It's the same with tail tone. Try to grab your horse's tail and lift it up. You'll feel some resistance, but, in a horse with botulism, you won't."

Other signs include eating more slowly, foals leaking milk from the mouth while suckling, recumbency or inability to rise, and even colic.

What makes it difficult for horse owners to diagnose botulism is how this disease mimics the primary clinical signs of other diseases such as tetanus, equine protozoal myeloencephalitis (EPM), equine herpesvirus-1 (EHV-1), Eastern equine encephalomyelitis (EEE), and West Nile virus (WNV).

How can you tell the difference? "Horses with EPM are weak," explains Dr. Barr. "A lot of times, those horses' coordination is abnormal. A lot of times, they'll have muscle atrophy, and botulism-affected horses don't have that."

For horses with EHV-1, they usually have a history of fever prior to their onset of neurologic signs. Also, horses with the neurologic form of EHV-1 will be affected more in their hind limbs rather than their front limbs, whereas botulism is a generalized muscle weakness.

Veterinarians can conduct simple tests to help diagnose botulism, including pulling on the tongue. The other is called the "grain test" in which a small amount of sweet feed is offered in a large flat tub and a vet monitors how long it takes the horse to eat the feed.

If botulism is recognized early, there is a chance to save the horse using an antitoxin and supportive therapy. An affected horse might require several days of round-the-clock intensive care at an equine hospital. Hospitalization can be very costly—with just \$1,000+ for the antitoxin alone, and this doesn't include intensive hospitalization and rehabilitation.

The Best Defense is Prevention

There is no comparison between the cost of treatment and the cost of vaccination. Botulism can be prevented with the use of one vaccine, which is the only USDA-approved vaccine for *Clostridium botulinum* type B, called BotVax B, made by Neogen. An initial vaccination includes three separate doses in one month intervals. After that, horses can be vaccinated once a year.

Even if your region is not known to have a problem with botu-

continued on page 182

BOTULISM: MORE DEADLY THAN WRINKLES

continued from page 180

lism, you might be traveling to another part of the country or use hay shipped in from elsewhere, especially during the busy show season. Therefore, botulism is not restricted to one single region.

Other ways of preventing botulism include checking hay and grain for signs of decay and the presence of dead animals, which might contain the botulism toxin. If you use round bales for your horses, make sure they have been properly processed and are stored in an enclosed area. Hay bales stored outdoors should be kept off the ground on pallets, and they should not be wrapped in plastic—just covered with a tarp. Rodent and bird control around the barn is also an integral part of prevention.

Treating the Toxin

Treating botulism consists of a two-fold process. According to Dr. Barr, treatment includes appropriate management, nursing care, and the most important aspect, the antitoxin. The anti-toxin includes antibodies that bind with the toxin and hopefully neutralize the toxin. The earlier you get the antitoxin started in the affected horse, the better it will have chance of survival. But treatment isn't cheap; the antitoxin for botulism type B costs thousands of dollars, and that doesn't include the intensive care that the horse will need. Add in ventilation, the costs of nutritional support, fluids, and human resources, and the costs can skyrocket.

"One thing I will tell my clients is the fact that even though we're treating with the antitoxin, that doesn't mean that tomorrow the horse is going to jump up and be 100 percent. It's actually the exact opposite," explains Dr. Barr. "I'll tell people we treated the horse with the antitoxin, but probably within the next 24 hours the horse is going to get worse before it gets better. That's because the antitoxin just binds to the toxin that's still in the bloodstream. Unfortunately, the antitoxin can't do anything about the toxin that has already bound at the neuromuscular junction. Still, studies have shown that the sooner you get the antitoxin on board, the better prognosis the horse has for recovery. That's probably one of the keys that are important to treatment."

With appropriate nursing care, you want to make sure the horse is on the appropriate fluids and anti-inflammatories. A treated horse should be kept in a quiet stall where it won't be stressed. If the horse is down (recumbent/unable to get up), technicians will try to keep it sternal (rather than lying on its side) in a well-padded stall with a lot of bedding in hopes of limiting the sores on its bodies from staying down. Some stalls actually have mattresses covered in synthetic sheep-

skin to help minimize the pressure sores. Veterinarians and technicians will make sure the horse is passing urine and feces, because the patient can become constipated.

So, is a horse affected with botulism a lost cause? Adult horses that have progressed to respiratory paralysis usually die or require euthanasia. However, if the horse does not develop respiratory paralysis, it can make a complete recovery without lingering effects. Some might have prolonged problems stemming from complications, though. Foals generally have a very good survival rate with aggressive therapy. Because of their smaller size, treatment and costs are more manageable.

Botulism can be largely avoided with proper education and preparation. "If you're a horse owner in Texas and your horse doesn't go anywhere, is it necessary to vaccinate for botulism? Probably not," says Dr. Barr. "But, if you're in Texas

and you have show horses that ship to Kentucky or out to the East Coast, then they definitely need vaccination.

"People think that because they don't live in a high-risk area, their horse isn't going to get botulism," she continues. "That's not necessarily true, especially if your horse is constantly on the road, and especially if you buy hay and feed from the local feed store while on the road, where the hay could come from an area where there is a high risk of botulism."

Botulism is not an easy disease to diagnose, but it can be an easy one to prevent.

Personal Experiences with Botulism

If you've had a horse that was affected with botulism, Neogen would like to hear from you. You can read personal stories about horses that were affected with botulism on their Botulism Blog (<http://www.neogen.com/blog/equinebotulism/>) and share your own experiences. The more knowledge researchers have about the disease, the easier it will be to understand and treat.



Vaccination with BotVax B is one of the best defenses against botulism, as well as practical farm maintenance.

Photo courtesy Neogen Corporation