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Case Report

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A Case Report: Tetanus Treatment Protocol in a Cart-horse

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Abstract

Tetanus is a fatal disease of horses and humans instigated by Clostridium tetani. The agent is known for producing potential toxins responsible for spastic paralysis. A cart-horse with a complaint of shivering, unable to take in feed and water, and hesitant to walk is described in this case report. The physical examination was indicated an increased in respiratory rates (32breaths/min). The third eyelid of the horse was prolapsed (right side) and had stiffened gait and locked jaws (unable to take water and feed and ropy saliva). A deep puncture due to nail was seen on the sole of the left forelimb. The findings were concluded as tetanus. The treatment protocols executed wound management, neutralizing circulating toxin, reducing further hyper-excitability, contractility, and bacterial propagation. The concurrent administration of Procaine penicillin G, Tetanus antitoxin (TAT), Acepromazine, and other supportive therapy was conveyed successful recovery within two weeks. Hence, tetanus could be cured if treated early and following the proper protocol.

Keywords: Cart-horse • Tetanus •Treatment protocol

Introduction

Tetanus or lockjaw is an often fatal disease caused by gram-positive, spore-forming obligate anaerobe bacillus Clostridium tetani whose spores survive in soil and cause infection by contaminated wounds. It is a ubiquitous organism and a commensal of the gastrointestinal tract of domestic animals and humans [1]. Horses and humans are highly susceptible to tetanus toxins, ruminants and pigs are moderately susceptible while poultry is resistant [2]. Tetanus continues to be associated with a high mortality rate, ranging from 58% to 80% in. It is an acute, spastic paralytic illness caused by tetanospasmin, a neurotoxin produced by the vegetative form of Clostridium tetani and it is one of the very few diseases where the clinical manifestations are very characteristic [3]. The incubation period is approximately 8 days (range 3 to 21 days).

The most common source of environmental exposure to *C. tetani* bacilli and spores is soil, where the organism is widely but variably distributed. The spores are more common in soils with an alkaline pH and nutrient-rich soils in warm, moist climates that could more easily support the multiplication of the bacillus. Both herbivores and omnivores are reservoirs (harbor tetanus bacilli and spores in their intestines) of *C. tetani* and contaminate the soil by disseminating the organism in their feces. The fecal carriage has been reported in 10% to 20% of horses and 25% to 30% of dogs and guinea pigs; fecal specimens from several other species, including sheep, cattle, and small mammals, also were found to contain *C. tetani* [4].

The organism gains entry into the body via wounds. Although deep, penetrating wounds, such as punctures with sharp materials like a nail, are more liable to permit proliferation of Clostridium tetani, even superficial wounds can provide suitable anaerobic conditions required for their transition to the vegetative form and replication at the site of infection and to produce a toxin [5]. Accordingly, tetanospasmin toxin is taken up from the site of production into terminals of lower motor neurons and transported axonally to the spinal cord and/or brainstem. Here the toxin moves trans-synaptically into inhibitory nerve terminals, where a vesicular release of inhibitory neurotransmitters becomes blocked, leading to disinhibition of lower motor neurons. Muscle rigidity and spasms ensue, often manifesting as trismus/lockjaw, dysphagia, opisthotonus, or rigidity and spasms of respiratory, laryngeal, and abdominal muscles, which may cause respiratory failure and death [6].

Although, Clostridium tetani grows in anaerobic condition at 37°C on a variety of media (including blood agar), diagnostic and therapeutic decisions should not be made based on the culture, since cultures are frequently negative in patients with clinical tetanus, and routine bacteriologic studies do not indicate whether a strain of *C. tetani* carries the toxin plasmid [7].

Antibiotics to which the bacilli of *C. tetani* are susceptible include penicillin, erythromycin, clindamycin, tetracycline, chloramphenicol, and metronidazole. Therefore, the present case report describes the management protocol of tetanus in cart horse.

Case Description

A stallion with the history of shivering, unable to eat, drink, and hesitant to walk was examined on February 26, 2020. According to the complaint, the condition was seen one day before the presentation. The stallion was a cart-horse and has shoes on the sole, kept at home after work and fed "Frushka". The physical examination revealed that the rectal body temperature of the stallion was 37.7^{O}C with 32breaths/min and 64beats/min respiratory and heart rates, respectively. The third eyelid of the stallion was prolapsed (right side), the hind legs and tail were stiffened (Figure 1B), had stiff gait and locked jaws (unable to take water and feed) (Figure 1C). Saliva was drooling from the mouth (Figure 1A). The stallion had also wounds on his body and one deep puncture due to nail was seen on the sole of the left forelimb (Figure 1D). Generally, the stallion was poorly managed and had lesions alike epizootic lymphangitis (EZL). Therefore, Tetanus was tentatively diagnosed based on the history and characteristic clinical features noticed.

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Figure 1. A tetanus case of a horse with drooling of saliva (A); stiffen neck and locked jaw(C), and stiffen tail (B).

Treatment protocol and outcome

The stallion was treated following tetanus management protocols indicated in Constable et al., 2017, i.e. to halt further propagation of the agent, neutralize the circulating toxins, control of muscle spasm. Accordingly, ACP (Acepromazine, Elanco) 2 mg/ml at a dose of 0.03-0.125/ kg body weight, as muscle relaxant was administered IM. Procaine penicillin G at a dose of 20,000 IU/ kg/day for seven successive days was managed IM. Besides, Tetanus antitoxin or TAT with 100 IU/kg therapeutic dose was managed IM. Besides, the deep puncture due to nail was opened after the shoe removed and irrigated with antiseptic to expose the agent to oxygen. Other local wounds on the body of the stallion were also managed with povodine iodine.

Finally, the owner was advised to keep his stallion in quiet (the ear stuck down with cotton) and darkroom to reduce further spasm and contraction in response to light.

During the successive therapy and visit at home, the jaw movement was gradually improving and started to take in feed and water. On the 14th day visit the stallion was fully recovered; walking and jaw movements were resumed to normal. Communication with the owner a week later revealed that the stallion was getting back to work.

Discussion

In the present instance, a clinical case of tetanus was diagnosed tentatively based on the presence of wound and characteristic clinical manifestations. The case may be associated with deep puncture due to nail on the left forelimb of the horse which acquires the agent favorable environment for the transition to vegetative form, multiply and produce toxin; which is in line with various literatures [8]. Clostridium tetani produce exotoxins, such as tetanolysin and tetanospasmin. Tetanolysin's function is not clear; however, it is believed to damage healthy tissues around the wound and to reduce oxidation-reduction potential, thereby promoting the growth of anaerobic organisms whereas tetanospasmin is a neurotoxin and is commonly known as tetanus toxin. All recognized tetanus manifestations result from tetanospasmin's ability to inhibit neurotransmitter release from the presynaptic membrane for several weeks and causing important neurological disorders, which requires quick medical action and intensive patient care because of the risk of poor prognosis and complications.

Similar to the current case management protocol, various works commend manifold tetanus management protocols which include the use of Tetanus Anti-Toxin (TAT) as early as possible, and as soon as the clinical diagnosis is done, to neutralize the circulating toxin. Antimicrobial medication against Clostridium tetani becomes critical, to eradicate the focus of the infection inoculation and propagation. The maintenance of a quiet environment with no light stimuli ensures the reduction of spasms and muscle contractions that worsen the course of the disease. Most cases of tetanus result in death due to respiratory failure and dysphagia (due to lockjaw) which is a direct effect of tetanospasmin hence drugs that should decrease spasticity effectively are found imperative. In the present case, drugs such as ACP (Acepromazine), tetanus antitoxin or TAT and Procaine penicillin G which were believed to achieve the above preconditions were used with the paramount outcome. The stallion fully recovered after two weeks of rigorous therapy.

Conclusion

In conclusion, tetanus or lockjaw is a disease most commonly affecting horses and characterized by spastic paralysis caused by the toxin produced by Clostridium tetani, a ubiquitous organism and commensal of the gastrointestinal tract. Though horses are highly susceptible and most cases terminate with death, instant treatments accompanied by appropriate tetanus management protocols have a considerable effect.

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References

1. Peter Constable, Kenneth. "Veterinary Medicine: A Textbook of the Diseases of Cattle, Horses, Sheep, Pigs, and Goats." *Vet Med* (2017):2;1360.
2. Anderson, David. "Chapter 63 - Muscular Tone and Gait Abnormalities. In: Rings D, editors. Food Animal Practice (Fifth Edition)." *Vet Med* (2009):5;283-299.
3. Ferreira, Fabricio and Silva Franciele. "Case Report: Accidental Tetanus." *J Infe Dis Tre* (2016):2;20.
4. Jankovic, Joseph. "Chapter 34 - Tetanus Toxin. In: Albanese A, Atassi MZ, Dolly JO, Hallett M, Mayer NH, editors." *Ther Clin Prac* (2009): 5;406-425.
5. Graener, Damjan. "A twenty-year retrospective study of tetanus in horses: 42 cases." *Vete Arc* (2015):85;141-149.
6. Hassel, Bjørnar. "Tetanus: Pathophysiology, Treatment, and the Possibility of Using Botulinum Toxin against Tetanus-Induced Rigidity and Spasms." *Toxins* (2013):5;83.
7. Prajitno, Wahyu. "Case report: Diazepam in Severe Tetanus Treatment." *J Trop Med Pub Health* (2004):35;175-181.
8. Lisboa, Thiago. "Guidelines for the management of accidental tetanus in adult patients." *Rev Bras Ter Intensiva* (2011):23;394-409.

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