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Tetanus (lockjaw) is a serious bacterial infection caused by *Clostridium tetani* which produces a neurotoxin that affects the brain and nervous system. If a wound is contaminated with *Clostridium tetani* spores, the neurotoxin produced interferes with the nerves that control normal muscle movement thus resulting in marked muscle stiffness, spasms, and convulsions.

Little has been published on the clinical manifestations of tetanus in dromedary camels although individual cases of the disease have been reported in some countries including Egypt, Somalia, Ethiopia, United Arab Emirates, Pakistan, and the former USSR (Abdurahman & Bornstein, 1991; Abbas & Omer, 2005; Fassi-Fehri, 1987; Mares, 1954; McGrane & Higgins, 1985; Morcos, 1965; Rabagliati, 1920; Wernery et al., 2004).

31.1 Etiology

Clostridium tetani is an obligate anaerobic, gram-positive, motile, spore-forming bacillus which causes tetanus in man and animals. It is commonly found in soil and manure. Each bacterial cell can form a spore at one of its ends, giving the cell a characteristic drumstick appearance. These spores are extremely resilient and long-lived spores that resist heat and antiseptics. They occur worldwide in the soil and the intestines and manure of animals including man, especially in hot, damp areas and where the soil is rich in organic matter.

31.2 Pathogenesis

C. tetani spores usually enter the body through cuts and open wounds. In wounds with low oxygen content, the spores may begin to germinate and grow in the wound, releasing two distinct toxins: tetanolysin, which causes local tissue destruction, and tetanospasmin (also known as tetanus toxin), which is a very potent toxin

responsible for tetanus symptoms such as muscle rigidity, convulsions, and spasms of the skeletal muscles, especially upon excitement. This toxin spreads via the lymphatic system and bloodstream, reaching different parts of the nervous system throughout the body where it blocks the release of certain inhibitory neurotransmitters leading to widespread activation of motor neurons and muscle spasms beginning at the top of the body and moving downwards, followed by spasms of the abdominal muscles and limbs.

31.3 Clinical Picture and Pathology

Wernery et al. (2004) described an acute form of tetanus in a 5-year-old dromedary camel 20 days after its castration. The symptoms started with a stiff gate, extension of the neck, frothy salivation, refusal to feed, and swelling of the preputial sheath and groin. Three days later, the animal developed lockjaw and failure to swallow and by the 26th day after castration it failed to stand up due to hindquarters paralysis and was euthanized. Abbas and Omer (2005) also mentioned lockjaw, opisthotonos, and stiffness of the limbs in affected camels. Other clinical signs include paralysis of the throat muscles and inability to swallow food as well as paralysis and distension of the third eyelid in addition to stiffness of the neck and tail. Acute cases may lead to death of the animal whereas subacute cases may recover.

Schwartz and Dioli (1992) associated tetanus in camels with the condition known as “wry neck;” however, this remains to be proven since several alternative etiologies of wry neck in camels have been proposed.

Successful treatment of an affected camel with 60,000 IU.

31.4 Diagnosis

The diagnosis of tetanus is based on history of injury (e.g., open castration and deep wounds) followed by the appearance of clinical signs consisting of generalized rigidity, stiffness, and convulsive spasms of the skeletal muscles, and inability to swallow or “lockjaw.” These spasms start at the top of the body and spread down, often terminating fatally. Laboratory tests have little value in the diagnosis of tetanus.

31.5 Treatment and Prevention

Although *C. tetani* is susceptible to several antibiotics, the usefulness of antibiotics in the treatment of tetanus in camels is unknown. On the other hand, treatment involving the administration of tetanus antitoxin to bind and neutralize the toxin has been reported in camels by Morcos (1965). This author successfully treated a dromedary with 60,000 I.U. of anti-tetanus serum over a period of 3 days. Care of

the wound and supportive treatment using tranquilizers and muscle relaxants may also be helpful.

A tetanus toxoid consisting of formaldehyde-inactivated tetanospasmin is commercially available and is used, often in combination with other vaccines, to protect domestic animals, including new world camelids, against tetanus. No information is currently available on vaccination against tetanus in dromedary and Bactrian camels. However, Wernery et al. (2004) recommended the vaccination of these animals against tetanus prior to castration.

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