CASE REPORT

Successful Management of Tetanus in a German Shepherd Pup – A Clinical Case Study

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Tetanus is a disease characterized by symptoms caused by the release of neurotoxins produced by the vegetative form of an obligate anaerobic spore-forming Gram-positive bacillus, *Clostridium tetani*. These neurotoxins affect nerves, the spinal cord, and the brain, leading to muscle spasms due to hyperexcitability. While tetanus is more commonly recognized in humans and horses, it can be a potentially life-threatening condition in dogs, despite their natural resistance to the toxin (Bleck, 1991). *Clostridium tetani* produces three types of toxins: tetanospasmin, tenolysin, and non-spasmogenic toxin, with tetanospasmin being the most clinically significant. This toxin inhibits neurotransmitter release at the interneurons of the spinal cord and brain, resulting in characteristic clinical signs such as muscle rigidity, trismus (lockjaw) and spasms (Bleck, 1991).

The spores of *C. tetani* are ubiquitous in the environment, particularly in soil and dust, where they can remain viable for years. Infection typically occurs through deep penetrating wounds or ingestion (Skiles *et al.,* 2023), as seen in teething animals, where the spores vegetate under anaerobic conditions (Grant and Long, 2023). In dogs, the incubation period for tetanus can vary from 3 days to 3 weeks post-infection (Bandt *et al.,* 2007). Clinical signs may manifest as localized tetanus, affecting specific muscles near the site of injury, or generalized tetanus, which involves widespread muscle rigidity and spasms affecting the entire body (Greene, 2012).

Case History and Observations

A three-month-old male German Shepherd pup was presented with a history of voice changes and inability to bark, following ingestion of a goat horn three days before. The pup had started exhibiting trismus (jaw rigidity) and mild abdominal pain by Day 3. Physical examination on Day 1 revealed normal vital signs, including temperature (101.9°F), heart rate (100 beats/min), and respiration rate (40 breaths/min). Initial diagnostic tests, including complete blood count (CBC) and biochemical analysis, showed no significant abnormalities. Thoracic radiography indicated aerophagia in the cervical oesophagus, with no abnormalities detected in the thoracic region. Abdominal ultrasonography revealed hypomotility and distended intestinal loops.

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Treatment and Discussion

Treatment commenced with Tab Metronidazole (20 mg/kg BW OD for 5 days), Syrup Lactulose (0.5 mL/kg BW TD for 5 days) for faecal softening, and Tab. Petmina (1 tab OD for 5 days) for nutritional support (multivitamin and prebiotic). On Day 5, clinical signs worsened, with stiff jaw, facial muscle rigidity (Risus sardonicus), erect pinnae, sunken eyes, severe neck muscle rigidity (Opisthotonus), and stiff gait. These signs, combined with the history of goat horn ingestion and constipation, supported a diagnosis of generalized tetanus.

Treatment included administration of equine serum tetanus antitoxin (Inj. Tetglove @ 25 IU/kg b.wt, IV once) to neutralize circulating toxins. Antibiotic therapy with Inj. Taxim (50 mg/kg b.wt, IV twice daily for 5 days) and Inj. Metronidazole (20 mg/kg b.wt, once daily for 5 days) was initiated to eradicate *C. tetani* infection. Palliative sedation with Inj. Midazolam (0.3 mg/kg IV, every 4 h) and muscle relaxation with Inj. Magnesium sulphate (loading dose of 70 mg/kg over 30 min, followed by continuous rate infusion at 30 mg/kg/h) aimed to alleviate muscle spasms and autonomic hyperactivity. Supportive therapy included fluid administration (Inj. DNS 300 mL, IV) to maintain hydration.

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Fig. 1: Clinical signs of generalized tetanus showing marked extensor muscle rigidity, risus sardonicus, enophthalmos, and erect pinnae.



Fig. 2: Clinical improvement after 6 days of treatment, with the pup attempting to bear weight and was also able to swallow food normally.



Fig. 3: Follow-up on day 20 of treatment showing complete recovery with normal gait, normal feed and water intake (FDU) and an active general condition.

Gradual improvement was observed over 6 days of intensive treatment. By Day 20, the pup showed significant recovery, with resolution of muscle rigidity, improved gait, and normal clinical parameters. The prognosis for tetanus in dogs depends on the severity of symptoms and prompt initiation of treatment, with reported survival rates ranging from 50% to 92% (Adamantos and Boag, 2007).

The prognosis of the disease is directly proportional to the severity of the symptoms and the intensive nature of treatment. The treatment aims to prevent further release of toxins, neutralize toxins and provide supportive care. The recovery of the patient is dependent upon the formation of new nerve terminals and may take about a month for full recovery (Bandt *et al.,* 2007). There is no definitive antemortem tetanus diagnosis test available (Peter *et al.,* 2005) and it is usually based on the characteristic clinical signs. Blood sampling and biochemicals may not prove to be helpful but they may help in ruling out the other possible causes of neuromuscular disease (Acke *et al.,* 2004). Moreover, the absence of a punctured wound or recent surgery doesn't rule out the diagnosis of tetanus (Burkitt *et al.,* 2007).

The management of the disease includes wound management, tetanus antitoxin, antimicrobial therapy, sedation and muscle relaxation, nutrition and fluid therapy and supportive care (Acke *et al.,* 2004; Ives, 2014). In a study conducted by Ahmadsyah and Salim (1985), it was reported that metronidazole is more potent against anaerobic bacteria in dogs with significant lower mortality rates. Similarly, supraphysiological magnesium therapy proved to be helpful in reducing muscle spasm in dogs with severe tetanus symptoms (Simmonds *et al.,* 2011; Royaux *et al.,* 2020). According to many published clinical reports, the therapeutic dose of tetanus antitoxin can range from 10 IU/kg to 1,900 IU/kg, with the toxin load more likely to determine the ideal dose than the patient's bodyweight (Burkitt *et al.,* 2007; Bandt, 2007; Adamantos and Boag, 2007).

It can be concluded that tetanus in dogs is a debilitating disease with potentially favourable outcomes if promptly diagnosed and managed with aggressive treatment protocols including antitoxin therapy, antibiotics, sedation, muscle relaxation, and supportive care. This case highlights the successful management of generalized tetanus in a young German Shepherd pup, emphasizing the importance of early intervention and comprehensive therapeutic strategies.

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