

MANAGEMENT OF GENERALISED TETANUS IN A DOG

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A ten month old male non-descript dog weighing 10 kg was presented to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Pookode, Wayanad with a complaint of stiffness of all limbs, lethargy, inappetence and salivation for the past four days. The dog was in lateral recumbency with contracted facial muscles, erected ears, extended neck, rigid limbs and an elevated body temperature (104 °F). It was hyperaesthetic to external stimulus and sounds. Based on the clinical manifestations, the case was tentatively diagnosed as generalised form of tetanus. The dog was treated with Penicillin, Tetanus antitoxin, Diazepam, Magnesium Sulphate, Methocarbamol and supportive drugs for 14 days followed by 25 days of physiotherapy. Animal made an uneventful recovery.

Keywords: Tetanus, Penicillin.

Tetanus is an acute non-contagious infectious, potentially life-threatening disease caused by *Clostridium tetani*, a spore forming anaerobic bacterium. This organism produces a specific neurotoxin called tetanospasmin; it binds the central nervous system which prevents the release of inhibitory neurotransmitter glycine. Decreased glycine release leads to over stimulation of motor neurons and subsequent muscle rigidity causing diffuse muscle spasms and autonomic instability that characterizes the disease (Kasher and Glen, 2007). Almost all mammals are susceptible to tetanus, although dogs are relatively resistant. *C. tetani*, an anaerobe microorganism is found in soil and intestinal tracts of mammals (Sahal *et al.*, 2011). Tetanus is a preventable disease which commonly occurs with puncture or penetrating wounds, or contamination of the cutaneous wounds. It may be secondary to surgical procedures such as gastrointestinal surgery on rare occasions (Dienya *et al.*, 2013).

Materials and Methods

A ten month old male non-descript dog weighing around 10 kg was presented to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Pookode (Waynad), Kerala, with a complaint of lethargy, inappetence, salivation, locked jaw and stiffness of fore and hind limbs for

the past four days. The animal did not have any visible injury as per the owner but the vaccination and deworming were up to date.

General inspection of the dog showed dull and depressed condition with severe tenesmus. Clinical examination revealed contracted facial muscles with retracted lips, wrinkled skin at the forehead, erected ears and extended neck. Animal was unable to open the jaw. It was hyperaesthetic to external stimulus and sounds. It had a temperature of 104 °F, and respiration (22/min), pulse (80/min), heart rate (82/min) were within the normal range. Physical examination of the abdomen showed tensed abdomen and generalized tonic spasms were noticed in both front and hind limb muscles as well as in neck and tail muscles. The dog was unable to stand.

Haemogram revealed leucocytosis, and the values were RBC 6.7×10^6 cells/mm³, haemoglobin 12.2 g/dL, PCV 34.2 %, MCV 51.1 fL, MCH 21 pg, MCHC 35.7 g/dL, platelet count 4.57 lakhs/L, TLC 19.3×10^3 cells/mm³, neutrophil 87.1 %, lymphocyte 30 %, monocyte 6.5 %, eosinophil 2.4 %. Serum biochemical parameters were BUN 19.36 mg/dL, creatinine 1.28 mg/dL, total protein 4.8gm/dL, albumin 2.6 gm/dL, globulin 2.2gm/dL and A:G ratio 1.18.

Based on the history, clinical manifestations and haemato-biochemical changes, the case was diagnosed as

generalised tetanus and was treated with Inj. Penicillin 1ml/5kg BW, I/M, OD), Inj. Tetanus antitoxin, 500 I.U., I/V, single shot), Inj. Diazepam (0.5 mg/Kg BW, I/M, OD), Inj. Magnesium Sulphate 10 % solution (20 ml, S/C, OD), electrolyte and fluid therapy

(Fig. 1) was performed followed with supportive therapy and specially Tab. Robinax (250 mg, PO, TID) started after opening of jaw of the dog; for 14 days which was followed by 25 days of physiotherapy.



Fig. 1- Fluid therapy being given to rehydrate the Patient

Results and Discussion

Animal showed a remarkable clinical improvement after two weeks. The dog was able to stand, bear weight on its limbs and had normal appetite. After eight weeks of treatment, the dog was alert and active with normal mentation.

Tetanus is an acute disease caused by the action of the neurotoxin tetanospasmin, produced during the vegetative growth phase of *Clostridium tetani*. *Clostridium tetani* is a gram-positive and spore-producing anaerobic bacteria. Spores of *Clostridium tetani* are found in the soil. Tetanus usually develops after a wound when it becomes contaminated with the spores of *C. tetani*. The organisms gain entry into the body via wounds. Although deep and penetrating wounds are more liable to permit proliferation of *C. tetani*. The incubation period of tetanus is 4 to 12 days after the infection as also reported by Tomek *et al.* (2004). It is characterised by muscular rigidity and intermittent spasms. It is a very rare condition in dogs and cats because of their natural resistance to the toxin as also mentioned by De Risio and Gelati (2003); Acke *et al.* (2004).

In the present case, there was no history of wound or surgery which suggested that the route of infection may be through mucosal breakage. Under anaerobic

conditions, the spores can germinate into the vegetative form and multiply. Exotoxins are produced locally at the site of the wound. Tetanospasmin ascends to the CNS through the axons of motor nerves located adjacent to the wound and cell bodies within the spinal cord. Circulating tetanospasmin can also enter the brain directly through the blood-brain barrier. Tetanospasmin inhibits the release of the inhibitory neurotransmitters glycine and g-aminobutyricacid (GABA) at interneurons in the spinal cord and brain which leads to constant excitation of the nerves, causing the classical signs of tetanus as also recorded by Merret (1993).

Clinically two forms of tetanus can be seen as localised and generalised forms. The diagnosis is based upon the history, clinical signs, and progression of the disorder as also reported by Mathew and Forbes (1985). The major clinical signs seen are hyper-extension of the muscles of limbs, neck and tail, and the typical facial muscle abnormalities like wrinkled forehead, erect ears and retracted lips and locked jaw. Autonomic dysfunction in cases of generalized tetanus could result in respiratory failure, heart arrhythmias, seizures and death as also recorded by Hsu and Groleau (2001). Blood samples for complete blood count (CBC) and biochemistry are often being unhelpful. However, these

investigations may help in ruling out other possible diseases. The differential diagnosis should also be eliminating other states with similar clinical signs such as hypocalcaemia, meningitis and strychnine poisoning as also mentioned by (De Risio and Gelati, 2003; Low *et al.*, 2006).

Treatment of generalised tetanus is done based on 3 principles: 1.)- neutralization of the circulating tetanospasmin with antitoxin; 2.)- inhibition of the growth of *C. tetani* with antimicrobial drugs and 3.)- providing supportive care until the toxin's effects have worn off as also mentioned by Sprott (2008). This consists of intravenous antitoxin, antibiotics, wound debridement, sedation/ muscle relaxation and proper nursing care (feeding, maintaining hydration, preventing soiling, etc). Untreated cases are usually fatal due to respiratory complications.

Tetanus antitoxin should be given as soon as possible to neutralize any free or unbound toxin and should be given as soon as possible after the onset of clinical signs. Antitoxin should be administered intravenous route to rapidly achieve high levels in the circulation. One I/V dose of 250 – 500 IU (up to a maximum of 1,000 IU) will achieve therapeutic blood levels for 14 days. Antibiotic therapy is indicated to eliminate the vegetative form of *C. Tetani* organisms and to prevent further toxin formation. Muscle relaxants and sedatives are indicated in cases with marked muscle rigidity and hyper-excitability. Diazepam is used as a muscle relaxant and it can be used when seizures occur.

Physiotherapy is used to increase the blood supply and lymphatic drainage to muscles. It also helps to relax the muscle spasms and to relieve pain. The timing of appropriate diagnosis and initiation of proper treatment and supportive treatments are important in tetanus patients. The complications seen in tetanus are pressure sores due to recumbency, hyperthermia and dysuria. No tetanus vaccine is available for dogs because of their relative resistance to the disease. Natural infection does not provide effective, long-lasting immunity as also

reported by Merret (1993). The best way to prevent tetanus is through rapid and appropriate wound management with proper antimicrobial selection. This case describes the clinical course of a rare disease in dogs and illustrates how these patients can be managed effectively.

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