

Clostridium tetani infection in goats

B.R. Harish¹, B.M. Chandranaik², Bhanuprakash³, S.R. Jayakumar⁴,
C. Renukprasad⁵ and G. Krishnappa⁶

Southern Regional Disease Diagnostic Laboratory (SRDDL)
Institute of Animal Health and Veterinary Biologicals (IAH & VB)
Hebbal, Bangalore-560024, Karnataka.

Introduction

Clostridium tetani induced tetanus in goats is almost invariably preceded by some event or set of circumstances commonly referred to as puncture wounds, obstetrical interventions, performance of routine procedures such as disbudding, dehorning, tattooing, castration, hoof trimming, dog bites, fighting by bucks and penetration of the oral mucosa by fibrous plant thorns (Van Tonder, 1975) along with persistent skin irritation caused by the constant rubbing by old eroded metal or iron, wood and rope have been identified as common causes for tetanus in goats. The incidence of tetanus is more prevalent in most of the regions of India and which depends upon the contamination of soil with this bacterial spores persisting for several years (Sinha and Thakur, 1978, Adak *et al.* 2002)

The causative agent is *Clostridium tetani*, an anaerobic, gram positive, spore-forming bacilli has worldwide distribution in man and animals as an intestinal commensal. These organisms are residents of the soil and may be excreted from animals feces because the tetanus organisms normal resident of the intestine of livestock (Mary.C. smith, 1994). These accumulated spores in soil cause infection in the animals kept under the intensive management. The incidences of the tetanus in goats have been well established and they are more susceptible. The clinical signs and predisposing factors are similar to tetanus in other species.

This communication elucidates five stray incidences of tetanus in goats in a jurisdiction of the ten kilometers radius in the Bangalore rural district.

Case history and incidence

Five different incidences of the disease were reported by the respective local veterinarians of the Bangalore rural district and was brought to



1. A buck with advanced tetanus. Note extensive rigidity, locked jaw and generalized stiffness of muscles.



2. Buck showing stiffness of the neck and reluctant to see.

the notice of the disease investigation section of Institute of Animal Health and Veterinary Biologicals (IAHVB). The scientists attended and

1 & 2 -Scientist, 3 - RA (SRDDL), 4 -Joint Director (SRDDL), 5-JD (RDI), 6 -Director

collected the clinical history, possible samples from ailing animals for laboratory examination.

On investigation, three bucks and two doe had clinical symptoms of stiffness of all four limbs, dullness, mild pyrexia, difficult to open the mouth (locked jaw), pyelo erection, anxious expression, mild bloat, reluctance to move, food accumulation in the mouth, salivation. Apart from this trismus with restriction of jaw movements, prolapse of third eye lids in three animals and ears and tail had become stiff. The animals were weak and dehydrated due to lack of feed and water. On clinical examination tachycardia, rapid labored breathing was noticed; the visible mucus membranes were congested. External examination revealed presence of wound at the horn region in two buck and one doe while fighting, and one doe had given birth recently. Among five animals three had hyperesthesia followed by collapse on ground with mild seizures eventually animals succumbed to the death with in 9- 13 days, two animals survived by timely intervention and appropriate treatment.

Laboratory Diagnosis

The postmortem examination did not reveal any definitive necropsy findings. The blood samples showed lowered hemoglobin (4-6 gm %), mild neutrophilia ($6.2 \times 10^3/\text{ml}$), and other parameters were in normal range. However, biochemical parameters showed deficiency of calcium (4.1 - 5.61 mg/dL) and phosphorus (3.22- 5.13 mg/dL), altered liver and kidney (BUN, 65 mg/dL, Creatinine- 2.2) function test values which were suggestive for the anemia and altered metabolic rates due to the severe dehydration, lack of feed intake, deficiency of micronutrients, loss of muscle movements and loss of reabsorption of fluids. Sterile swabs collected from the wound region of three animals observed growth on the anaerobic medium and stained smears showed typical drumstick, gram-positive bacilli, suggestive of *Clostridium tetani* with terminal spores.

Discussion

Tetanus is a well-known *Clostridial* disease of man and animals, the incidence of the disease is relatively very common in horses, however equally important in the goat husbandry (Mary, C, Smith,

1994). The spores of the tetanus are very resistant and persist for longer periods in the soil. The proliferation of the organisms with release of a potent neurotoxin can occur when spores are subjected to a suitable anaerobic environment as can occur in deep wounds or injuries in animals. In the present study, the infection originated from the wounds and parturition contacted spore contaminated soil leading to the rare incidence of the infection. The wound and soil played important predisposing factors and same has been mentioned by the earlier workers Sinha and Thakur, 1978, Mary, C, Smith, 1994 and Adak *et al.* 2002. In the present studies the diagnosis of the disease was made on the basis of history, clinical symptoms, laboratory diagnosis, microbiological examinations and differential diagnosis from the other similar clinical disorders like polioencephalomalacia, hypomagnesaemia tetany and nutritional muscular dystrophy. The disease was confirmed by the growth of anaerobic bacilli with terminal spores when the wound swabs were cultured: cultured spore forming is the species characteristic of *Clostridium tetani* (Cruickshank, 1975). The polioencephalomalacia, which is very common in goats, can be differentiated on the basis of bacterial isolation and typical symptoms like opisthotonos and convulsions in the terminal stages. (Mary C, Smith, 1994). The affected animals exhibited symptoms were locked jaw, salivation, hyperesthesia, seizures, mild pyrexia, dehydration, anorexia, reluctance to move, prolapse of third eye lids, stiffness of ears and tail indicative of tetanus were correlating with the clinical symptoms as reported by the earlier workers in goats Van Tonder (1975), Sinha and Thakur (1978) and Mary C, Smith (1994), and Ramprabhu *et al.* (2001) in dogs, Tuteja *et al.* (2001) in camels and other animals (Radostits *et al.* 1994). The altered hematobiochemical values were rarely reported in tetanus goats.

The ailing animals were treated with anti tetanus toxin at the rate of 10,000-15000 units intravenously for every 12 hours for three days and higher antibiotics and other supportive therapy containing dextrose and electrolytes given to counter the dehydration and lack of feed intake.

The main goal of the giving anti tetanus toxoid is to inhibit the additional toxin production, neutralizing the existing unbound toxin, ameliorate the effects of bound toxin and to provide the whatever necessary support. The treatment with the higher antibiotics is to inhibit the additional bacterial proliferation and toxin release. The muscle relaxants and anti convalescents were injected to control the convulsions asphyxiation. After the suggested treatment two animals showed signs of recovery and improved after 20 days. Radostits et al., (1994) stated that after the signs of tetanus, treatment is not helpful as noticed in other three animals, which succumbed to the disease.

Summary

The rare incidence of the tetanus in goats was reported in the present investigation and detailed study has been conducted with the help of laboratory to differentiate from other diseases like polioencephalomalacia, hypomagnesaemia tetany and nutritional muscular dystrophy. Tetanus can be prevented by the combination of improved hygiene and immunoprophylaxis. Although there are scanty reports of tetanus of goats in India, meanwhile the disease is very common in equines, may be due to contaminated soil, which is the important predisposing factor. The exposure of animals to such environment may lead to tetanus incidences. In country like India, routine procedures such as disbudding, castration, dystocias and other surgical operations carried out in the unhygienic conditions may also precipitating factors. Apart from this, constant rubbing of eroded metals; automobile accidents and wounds originated from animals itself may be the potential source of the *clostridium tetani* organisms. All the routine operations in animals should be safe with proper hygienic conditions and accompanied by the antitoxin injections can reduce the incidences of such dreaded disease.

In areas of endemicity routine vaccination may be accepted as only choice for healthy herd management.

References

- Adak, K., Nag, N C., Hui. Chandra, S., Dhara, K., Mahata, T., Mondal, M. (2002). Studies on *Clostridium tetani* isolate from soil of different Districts of West Bengal and its antibiotic susceptibility pattern. *Journal of Interacademia*. **6**: 628-630.
- Cruickshank, R., Duguid, J.P., Marmion, B.P., and Swain, R.H.A., (1975). *Medical Microbiology*. 12 th edn, Churchill Living stone, Edinburgh.
- Mary C. Smith and David, M. Sherman. (1994). *Goat Medicine*, Lea and Febiger, Philadelphia, pg. 144-146.
- Radostits. O.M., Blood, D.C., and Gay, C.C., (1994). *Veterinary Medicine*, Bailliere Tindal, London.
- Ramprabhu R., Ravikumar M., Nagarajan B., Subramanian M., (2001). Tetanus in a dog and its clinical management. A case report. *Cheiron*. **30**: 1-2, 60-61.
- Sinha, R.P., and Thakur, D.K. (1978). An interesting case of tetanus in a buck. *Livestock advisor*, Bangalore, **3**: 41-43.
- Tuteja, F C., Sahani, M S., Rajender Kumar., Ghorui, S K., Sharma N., Kumar R., Tetanus in camel (*Camelus dromedarius*). (2001) .A case report. *Indian Journal of Veterinary Medicine*. **21**(2): 112-113.
- Van Tender, E.M. (1975). Notes on some diseases problems in Angora goats in South Africa, *Vet Med Rev.*, 109-138.