

## Theileriosis in Crossbred Cattle: Therapeutic Management and Control

Vipan Kumar\*, Parvinder Kaur, Heigo Pal, Hanish Sharma, Vinay Mohan Wadhawan,  
Charanjeet Sarangal and Gagandeep Bangar

### ABSTRACT

Bovine Tropical theileriosis having worldwide economic importance in cattle caused by *Theileria annulata*, a protozoan parasite, and transmitted by ticks. The disease is one of the major constraints to the dairy industry and causes devastating losses to the livestock in India. The present cases demonstrate the clinical manifestation, hematological alternation and therapeutic management of theileriosis in Holstein Friesian cattle in Jalandhar district. Clinical examination of affected animals revealed high fever (104-106° F), enlargement of superficial lymph nodes, pallor mucus membrane. The blood smears examination after staining revealed the presence of *Theileria* organisms. Buparvaquone along with supportive therapy could cure all the animals.

**Keywords:** Bovine tropical theileriosis, Buparvaquone, Theileria, Tick

### INTRODUCTION

Bovine Tropical theileriosis causes devastating losses to the livestock and dairy industry. In India the annual loss reported due to tropical theileriosis is approximately US\$ 800 million (Devendra, 1995). Bovine Tropical theileriosis is initiated by ticks. The hot and humid climate is highly favourable for the development and survival of ticks. *Theileria annulata* and *Theileria parva* are considered to be the most pathogenic species of Theileria. Tropical theileriosis is one of the most prevalent diseases of cattle caused by *T. annulata* (Mirzaei, 2007) and is transmitted through Ixodid tick of genus Hyalomma. The clinical manifestation of Bovine Tropical theileriosis diverge from peracute to acute to subacute to chronic. It mainly depends upon the damaging effect of pathogen on the lymphoid tissues and susceptibility to host. The major clinical manifestation of Bovine Tropical theileriosis pyrexia, generalised lymphadenopathy, anemia, anorexia, cachexia, respiratory distress, petechiae on conjunctiva, unilateral and bilateral exophthalmia (Sengupta et al., 2003; Branco et al., 2010; Sudan et al., 2012). The present report demonstrates clinical manifestation, hematological alternations and therapeutic management

theileriosis cases in cross bred cattle in Jalandhar district, Punjab.

### Case history and Observation

#### Case I

A Holstein Friesian cattle of age two year was attended with complaint of high fever, anorexia and dullness and no response to treatment with antibiotics and antipyretics for last three days. Clinical examination revealed 106° F rectal temperature, nasal discharge, tachypnoea, rough coat, tachycardia (92/min), enlarged prescapular lymph nodes and pale conjunctival mucous membrane. Examination of blood smear stained with Giemsa stain showed the presence of *Theileria annulata* piroplasms in large no of RBCs (Fig.1) and large numbers of Koch's Blue Bodies lymphocytes.

Haematological examination of blood sample revealed (Total Erythrocyte Count-  $2.10 \times 10^6 / \mu\text{L}$ , Hemoglobin-3.0g/dl, PCV-8.6%, Total Leucocyte Count-  $11.2 \times 10^3 / \mu\text{L}$ , ESR-150mm and DLC- Neutrophil 36%, Lymphocyte 60% Monocyte 4%) which indicates severe anaemia. on the basis of clinical findings and presence of *Theileria annulata* piroplasms in RBCs and large numbers of Koch's Blue Bodies (KBB) lymphocytes the case was diagnosis as a case of tropical theileriosis.

#### Case II

A Holstein Friesian Crossbred Heifer of age 10 months was attended with complaint of high fever since 3-4 days Clinical examination revealed 106° F rectal temperature, enlarged prescapular lymph

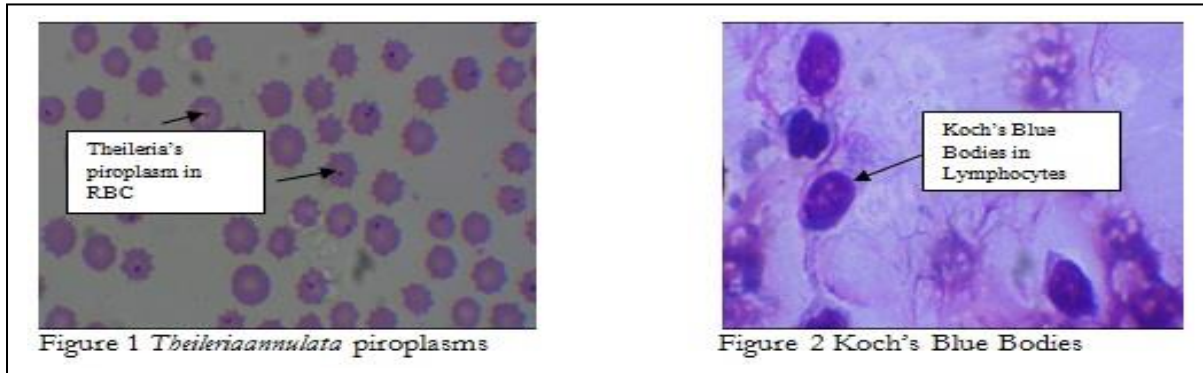
\* Corresponding author: vipanjolly@gmail.com

<sup>1</sup> Regional Disease Diagnostic Laboratory (North Zone), Jalandhar (India)-144001

nodes and pale mucous membrane. Ticks were found on the body of the animal. Blood smear examination revealed the presence of piroplasmsof *Theileriaannulata* in large no of RBCs and large numbers of Koch's Blue Bodies in lymphocytes (Fig.2). On laboratory examination, the ticks were identified as *Hyalomaanatolicum*.

## RESULTS AND DISCUSSION

The affected animals were treated with Buparvaquone (Butalex) @ dose rate of 2.5 mg/kg body weight intramuscularly and advised to repeat after seven days; meloxicam ( Melonex) was given @ the dose rate of 0.5 mg/kg body weight intramuscularly for three days. To correct



Haematological examination of blood sample revealed (Total Erythrocyte Count- $2.0 \times 10^6/\mu\text{L}$ , Heamoglobin-4.6 g/dl, PCV-9.6%, Total Leucocyte Count- $10.2 \times 10^3/\mu\text{L}$ , and DLC- Neutrophil 32%, Lymphocyte 63% Monocyte 5%). On the basis of clinical findings, presence of *Theileria annulata* piroplasms in RBCs and large numbers of Koch's Blue Bodies (KBB) lymphocytes the case was diagnosis as a case of tropical theleriosis.

### Case III

A Holstein Friesian cattle of age 3.5 year with history of fever and no response to antipyretics for last five days. On clinical examination revealed enlarged lymph nodes,  $104^0$  F rectal temperature. Examination of blood smear stained with Giemsa stain showed the presence of *Theileria annulata* piroplasms.

Haematological examination of blood sample revealed (Total Erythrocyte Count- $5.11 \times 10^6/\mu\text{L}$ , Heamoglobin-7.6 g/dl, Total Leucocyte Count- $10.2 \times 10^3/\mu\text{L}$ , and DLC- Neutrophil 42%, Lymphocyte 54% Monocyte 4%). Blood smear examination revealed the piroplasms in RBCs and case was diagnosis as a case of tropical theleriosis.

severe anemia 600 ml blood collected from healthy cow was transfused. A total 20ml of a commercial formulation containing vitamin 2.5 lac IU, vitamin D<sub>3</sub> 25,000 IU, Vitamin E 100 IU, and biotin 12.4mcg/ml (Intavita-H, Intas Pharmaceuticals, India) also given intramuscularly at weekly interval for three times. Topical application of flumethrin 1% pour on preparation (Bayticol pour on) over the vertebral column was advised. From second day there was remarkable improvement in clinical condition. Animal regain their normal appetite within seven days and the substaintial reduction in lymph node swelling was noticed.

A significant feature of the disease is anemia owing to overproduction of cytokines and reactive oxygen species (Nazifi et al., 2009; Saleh et al., 2011). Implication of oxidative stress for development of anemia in animals affected with theileriosis has been reported by the previous scientific workers (El-Deeb and Younis, 2009; Nazifiet al., 2011). Previously antioxidant potential of vitamins A, D<sub>3</sub>, E and H has been demonstrated (Singh et al, 2012) and the administration of these vitamins in the present cases might have helped to ameliorate the anemia of affected animals by mitigating the Theileria

induced oxidative damage to erythrocytes. Buparvaquone is a promising compound for the therapy and prophylaxis of all forms of theileriosis. The adjunction of antioxidants and anti-theilerial agents can salvage the animals from fatal theileriosis. Moreover large scale clinical studies are on adjunctive antioxidant is required to provide a novel therapeutic regimen of theileriosis. However, to prevent the infection of Theileria infection in animals in vitro attenuated schizont cell culture vaccine is available with trade name of 'RakshavacT' manufactured by Indian immunologicals limited, Hyderabad (Singh et al, 2014). It is further recommended that the high valued animals or high yielding animals may be vaccinated with this vaccine to prevent them with Theileria infection.

#### ACKNOWLEDGEMENT

The authors are grateful to Dr. H S Sandha, Director, Animal Husbandry for the facilities provided.

#### REFERENCES

1. Branco S, Orvalho J, Leitao A, Pereira I, Malta M, Mariano I, Carvalho T, Baptista R, Shiels BR, Peleteiro MC (2010). Fatal cases of *Theileriaannulata* infection in calves in Portugal associated with neoplastic-like lymphoid cell proliferation. *Journal of Veterinary Science*, 11(1):27 -34.
2. Devendra C (1995). In *Global Agenda for Livestock research*, EDS, ILRI, Nairobi. pp: 41-48.
3. El-Deeb WM, Younis EE (2009). Clinical and biochemical studies on *Theileriaannulata* in Egyptian buffaloes (*Bubalusbuffalis*) with particular orientation to oxidative stress and ketosis relationship. *Veterinary Parasitology*, 164:301–305.
4. Mirzaei M (2007). Treatment of natural tropical theileriosis with the extract of the plant *Peganumharmala*. *Korean Journal of Parasitology*, 45: 267-271.
5. Nazifi S, Razavi SM, Esmailnejad Z, Gheisari H (2009). Study on acute phase proteins (haptoglobin, serum amyloid A, fibrinogen, and ceruloplasmin) changes and their diagnostic values in bovine tropical theileriosis. *Parsitology Research*, 105(1):41-46.
6. Nazifi S, Razavi SM, Kiani Amin P, Rakhshandehroo E (2011). Evaluation of erythrocyte antioxidant mechanisms: antioxidant enzymes, lipid peroxidation, and serum trace elements associated with progressive anemia in ovine malignant theileriosis. *Parsitology Research*, 109:275-281.
7. Saleh MA, Mahran OM, Al-Salahy MB (2011). Corpuscular oxidation in newborn crossbred calves naturally infected with *Theileriaannulata*. *Veterinary Parasitology*, 182(2–4):193-200.
8. Sengupta PP, Bansal GC, Ray D (2003). Ocular lesions in experimental theileriosis. *Journal of Veterinary Parasitology*, 7(2):127-129.
9. Singh AK, Verma AK, Tiwari R, Neha, Karthik K, Dhama K, Singh SV (2014). Trends and advances in vaccines against protozoan parasites of veterinary importance: a review. *Journal of Biological Sciences*, 14(2):95-109.
10. Singh SK, Dimri U, Sharma MC, Swarup D, Kumar M, Tiwary R (2012). *Psoroptescuniculi* induced oxidative imbalance in rabbits and its alleviation by using vitamins A, D3, E, and H as adjunctive remedial. *Tropical Animal Health Production*, 44(1):43-48.
11. Sudan V, Sharma RL, Yadav R, Borah MK (2012). Turning sickness in a cross bred cow naturally infected with *Theileriaannulata*. *Journal of Parasitology Diseases*, 36(2): 226-22