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**Jitendra Kant Nagar**

Teaching Associate, Rajasthan  
University of Veterinary and  
Animal Science, Bikaner,  
Rajasthan, India

**Sarjna Meena**

Assistant Professor, Rajasthan  
University of Veterinary and  
Animal Science, Bikaner,  
Rajasthan, India

**Pratikshit Sanel**

Teaching Associate, Rajasthan  
University of Veterinary and  
Animal Science, Bikaner,  
Rajasthan, India

**Shashi Choudhary**

Teaching Associate, Rajasthan  
University of Veterinary and  
Animal Science, Bikaner,  
Rajasthan, India

**Punam**

Veterinary Officer, Veterinary  
Hospital Jakhera, Nagaur,  
Rajasthan, India

**Corresponding Author:**

**Jitendra Kant Nagar**

Teaching Associate, Rajasthan  
University of Veterinary and  
Animal Science, Bikaner,  
Rajasthan, India

## Diagnosis and therapeutic management of bovine tropical theileriosis in cross breed calves

**Jitendra Kant Nagar, Sarjna Meena, Pratikshit Sanel, Shashi Choudhary and Punam**

### Abstract

Theileriosis is a most important arthropod tick born blood protozoan disease in exotic and cross breed cattle in India. This increases morbidity and mortality, especially in crossbred calves, causing significant economic losses to farmers, which is a major problem for the dairy industry. It is caused by an obligate intracellular protozoan, *Theileria annulata*. It has a complex life cycle and it is transmitted through special tick *Hyalomma anatolicum anatolicum*. The present investigation deals with diagnosis and therapeutic treatment of bovine tropical theileriosis in ten crossbred calves 25 days to 2 months old in age. These calves presented in Veterinary Clinical Complex, PGIVER, Jaipur with history of tick infestation, dull, emaciation, rough skin coat, off feed and high fever. In these cases, clinical symptoms observed were high body temperature (104°-106 °F), anorexia, dullness, rough skin coat and enlarged pre-scapular lymph node, icterus to white conjunctiva mucous membrane and increase respiration and pulse rate. Based on haematological examination of bovine tropical theileriosis suspected cases found that decreased haemoglobin, packed cell volume and erythrocytes and lymphocytes but increase both leucocytes and neutrophils. Microscopic thin blood smears examination with Giemsa staining, found piroplasms in erythrocytes and found presence of schizonts (Koch's blue bodies) in lymphocytes in affected crossbred calves with bovine tropical theileriosis during lymph node aspirated smears. Based on clinical symptoms, haematological, microscopic blood parasite examination with Giemsa staining and lymph node aspirated smears examination, all crossbred calves were positive for theileriosis. Buparvaquone was administered intramuscularly at a dose of 2.5 mg per kg or 1 ml per 20 kg body weight after confirmation of the diagnosis of bovine tropical theileriosis in crossbred calves. In these cases, also gave antibiotic, anti-pyretic and hematinic drugs as a supportive medicine. All calves were very well responded to treatment and recovered uneventfully within 15 days. The present report presents the successful diagnosis and therapeutic management of bovine tropical theileriosis in calves.

**Keywords:** Bovine tropical theileriosis, pre scapular lymph node, ticks and buparvaquone

### Introduction

Bovine tropical theileriosis (BTT) is a most important arthropod tick born blood protozoan disease in exotic and cross bred cattle in India. This increases morbidity and mortality, especially in crossbred calves, causing significant economic losses to farmers, which is a major problem for the dairy industry. Any breeds of cattle are susceptible to theileriosis. Pure breeds, exotic or their cross breeds of cattle as well as the young calves (under 2 months of age) are highly susceptible to this disease. It is caused by an obligate intracellular protozoan *Theileria annulata*. It has a complex life cycle and it is transmitted through special tick *Hyalomma anatolicum anatolicum*. It is an important vector borne disease of tropical and subtropical parts of the world which causes economic crisis for any country. (Hasanpour *et al.*, 2013) [5]. It spread from the Mediterranean coastal areas to the Indian subcontinent and China. (Dolan *et al.*, 1992) [3]. Epidemiologically, newborn cross breed calves are at greater risk in the late spring, rainy season and early summer season because during these periods cross breed calves come into immediate contact with infected ticks which are more prevalent during this period. Calf mortality due to bovine tropical theileriosis is one of the major obstacles to livestock upgrading in the Indian subcontinent. (Srivastava, 1989; Sudan *et al.*, 2012; Singh *et al.*, 2017) [14, 15, 13]. In bovine tropical theileriosis, common clinical symptoms are anorexia, decrease body weight, high body temperature, enlarged lymph node (Parotid. Pre-scapular and

Pre-femoral) and anemia and in later stage icterus, dehydration and blood in faeces are the occasional clinical symptoms. Conventional method of diagnosis of tropical theileriosis depends on examination of thin blood smears with Giemsa stain and lymph node aspirated smears (Sharieff *et al.*, 2017) [12]. The present report presents the successful diagnosis and therapeutic management in affected ten cross breed calves with bovine tropical theileriosis.

**Materials and Methods**

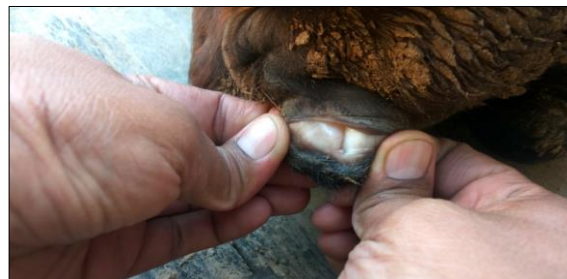
The present report was carried out among ten cross- bred cattle calves of age between 25 days to 2 months which were presented to the Veterinary Clinical Complex, PGIVER, Jaipur with the history of tick infestation, dull, emaciation, rough skin coat, off feed and high fever. Upon clinical examination, there are found high body temperature (104°-106° F), anorexia, dullness, rough skin coat, enlarged pre-scapular lymph node, icterus to white conjunctiva mucous membrane and respiration and pulse rate increased in affected cross breed calves. Blood samples were collected from jugular vein in blood collection vials containing EDTA for haematological examination and blood parasitic examination for theileriosis with Giemsa staining and lymph node biopsy smear for schizonts in affected cross breed calves with bovine tropical theileriosis.

**Therapeutic treatment**

Buparvaquone (Butalex injection) was injected in each cross bred calves at the rate of 2.5 mg per Kg or 1 ml per 20 Kg body weight via intramuscular route in the neck region along with Oxytetracycline at the dose rate of 5-10 mg per kg body weight with normal saline solution (NSS) via intravenous, Meloxicam + Paracetamol at the dose of 0.5 mg per kg body weight via intramuscular, Multivitamine injection 1.5 ml via intramuscular and haematinic medicine and advised beet juice in daily feeding diet.



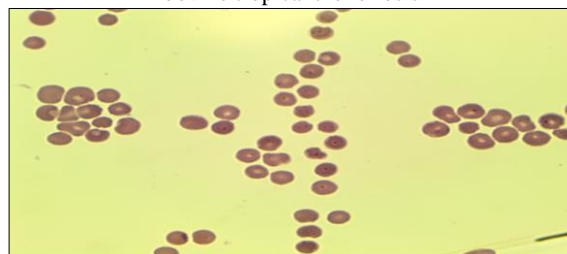
**Fig 1:** Dullness in affected calf with bovine tropical theileriosis



**Fig 2:** Whitish mucous membrane in affected calf with bovine tropical theileriosis



**Fig 3:** Enlargement of prescapular lymph node in affected calf with bovine tropical theileriosis



**Fig 4:** Microscopic blood picture showing *Theileria* in RBCs in affected calves with bovine tropical theileriosis

**Results and Discussion**

In present reports, clinical symptoms were found high body temperature (104°-106° F) with palpable enlargement of the prescapular lymph nodes (Fig.3), off feed, anaemia, off feed, These findings are in agreement with Radostits *et al.*, (2007) [10]; Bhojne *et al.*, (2010) [2]; Kohli *et al.*, (2014) [6]; Nagar *et al.*, (2019) [8].

In present reports, the haematological examination of affected cross breed calves with bovine tropical theileriosis found that decrease haemoglobin level, packed cell volume, total erythrocytes count and lymphocytes but increase both leucocytes and neutrophils (Table No.1). These findings are in agreement with Al-Hosary *et al.*, (2015) [11]; Goyal *et al.*, (2017) [4] and Nagar *et al.*, (2019) [8].

**Table 1:** Mean values of haematological parameters of cross breed calves affected with bovine tropical theileriosis

Sr. No.	Haematological Parameters	Mean value of cross breed calves affected with tropical theileriosis
1	Haemoglobin (g/dl)	5.1
2	Packed Cell Volume (%)	17
3	Total Leucocyte Count (×10 <sup>3</sup> /μL)	11.1
4	Total Erythrocyte Count (×10 <sup>6</sup> /μL)	4.0
5	Neutrophils (%)	44
6	Lymphocytes (%)	53
7	Monocytes (%)	2
8	Eosinophils (%)	1

In present reports, the microscopically thin blood smear examination with Giemsa stain found piroplasms in erythrocytes (Fig.4) and lymph node aspirated smears found

presence of schizonts (Koch’s blue bodies) in lymphocytes. These findings are in agreement with Padhiyar *et al.*, (2016) [9]; Sharieff *et al.*, (2017) [12]; Kumar *et al.*, (2019) [7].

Buparvaquone (Butalex injection) was injected in each cross bred calves at the rate of 2.5 mg per Kg or 1 ml per 20 Kg body weight via intramuscular route in the neck region along with Oxytetracycline at the dose rate of 5-10 mg per kg body weight with normal saline solution (NSS) via intravenous, Meloxicam + Paracetamol at the dose of 0.5 mg per kg body weight via intramuscular, Multivitamine injection 1.5 ml via intramuscular and haematinic medicine and advised beet juice in daily feeding diet for treatment of bovine tropical theileriosis in cross breed calves were reported by Verma *et al.*, (2018)<sup>[16]</sup>; Nagar *et al.*, (2019)<sup>[8]</sup>. Verma *et al.*, (2018)<sup>[16]</sup> stated that single dose of Buparvaquone is effective against the bovine tropical theileriosis along with Oxytetracycline and supportive therapy when treated at the earliest.

Effect of Buparvaquone with supportive treatment were observed in all ten cases, which found a marked clinical improvement in body temperature, appetite colour of mucous membrane, skin coat etc.

### Conclusion

In this investigation, it can be concluded that Bovine tropical theileriosis causes economic burden on livestock farmers in terms of mortality and morbidity as a result of which proper diagnosis and treatment is not done at appropriate time, resulting in severe economic losses. Buparvaquone is a drug of choice for the therapy of tropical theileriosis in calves and prophylaxis of all forms of theileriosis. Nowadays, *in vitro* attenuated schizont cell culture vaccine manufactured by Indian Immunologicals Limited (IIL), Hyderabad is available in the market with the trade name "RakshaVac T" (Singh *et al.*, 2014)<sup>[17]</sup> to prevent bovine tropical theileriosis. Therefore, it is recommended that high-value dairy cattle or cattle calves should be vaccinated with this vaccine to protect against bovine tropical theileriosis.

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