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Bovine tropical theileriosis in cross-bred calf: A case report

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ABSTRACT: Theileriosis is one of the most common tick-borne haemoprotozoan disease affecting dairy animals in tropical and subtropical region of the country and is responsible for causing huge economic losses to the dairy farmers. The current paper deals with clinical signs, diagnosis and treatment of bovine tropical theileriosis in a one-month-old crossbred calf.

Key words: Buparvaquone, cross-bred calf, Theileriosis

Theileriosis is caused by protozoal parasites of the genus *Theileria* that infect lymphocytes and erythrocytes of the ruminants. The *Theileria* species which affect cattle are *T. annulata*, *T. parva* and *T. mutans*. Out of these *T. annulata* is widely distributed and causes Bovine tropical theileriosis (BTT). In the Indian subcontinent, BTT has been persistently recognised as a major impediment to livestock improvement programmes. The disease causes high mortality in enzootic areas, up to 70% in dairy cattle, particularly calves (Radostits *et al.*, 2007). The parasite is found in two forms: erythrocytic form and schizont (Koch's blue bodies) form. The majority of parasites remain in erythrocytes as round, annular, oval or comma shaped organisms. Few of these organisms may appear as dots or in *Anaplasma* like forms. Schizont forms are observed in lymphocytes and monocytes. The disease is transstadially transmitted by ticks of the genus *Hyalomma* and causes health problem in domesticated cattle of all ages in tropical and subtropical regions including India (Morrison, 1998; Godara *et al.*, 2010). A nervous form of the disease, known as cerebral theileriosis (turning disease), may develop in cattle (Bradford and Smith, 1990; Radostits *et al.*, 2007). Bovine tropical theileriosis is clinically characterised by high rise in body temperature, enlargement of superficial lymph nodes, increased heart rate and respiration rate, anorexia, restlessness, weakness,

prostration and death (Bhatia and Shah, 2001).

Case presentation

A one month old cross-bred female calf weighing about 40 kg was presented to Teaching Veterinary Clinical Complex, College of Veterinary and Animal Sciences, Pantnagar from Dhampur district (Uttar Pradesh) with the history of high fever (104.9°F), anorexia, convulsions, pedalling (Fig. 1), incoordination, reduced water intake, shivering and respiratory distress. Clinical examination revealed opisthotonos, continuous pedalling, hyperaesthesia, respiratory distress, dehydration, pale conjunctival and vaginal mucus membrane, dry muzzle and enlarged pre-scapular lymph nodes. Ticks were also present on external surface of body. Physiological parameters revealed rectal temperature- 105.6°F, heart rate-118 beats per minute and respiratory rate- 58 breath per minute.

Clinical examination

A complete blood count (CBC) and faecal examination (by direct smear) were performed in the laboratory (Soulsby, 1982). Blood sample was collected in an EDTA coated vial for complete blood count. For hemoprotozoan disease and differential leucocyte count (DLC), a Giemsa stained thin blood

smear was prepared and examined.

Diagnosis

Faecal examination showed no parasitic eggs. On the basis of morphology tick was identified as *Hyalomma* spp. Blood smear revealed that approximately 40% of erythrocytes were infected by piroplasm of *Theileria* spp. (Fig. 2). CBC revealed reduced haemoglobin, packed cell volume, and total erythrocyte count, as well as lymphopenia and neutrophilia. Blood parameters were examined on 0th, 7th and 12th days post treatment (DPT) (Table 1).

Treatment

The calf was treated with Buparvaquone (Butalextm, MSD Animal Health, Pune, India) @ 2.5 mg per kg (repeated after 10 days), Oxytetracycline (Terramycin, Zoetis India Limited, Mumbai) @ 10 mg per kg diluted in 500 ml of normal saline solution once daily for 5 days and then on alternate days for 6 days, Meloxicam (Melonex, Intas Pharmaceuticals Ltd., Ahmedabad) @ 0.5 mg per kg once for 3 days, Feritas (Intas Pharmaceuticals Ltd., Ahmedabad) @ 1 ml once on alternate days for 6 days, eRBCe Rakkt (Vetoquinol India Animal Health Pvt Ltd., Maharashtra) @ 15 ml orally once daily for 15 days, syrup Livotas (Intas Pharmaceuticals Ltd., Ahmedabad) @ 15 ml orally once daily for 15 days.



Fig. 1: Picture showing poor body condition and pedalling of limbs

RESULTS AND DISCUSSION

Improvement in the condition of the calf was noticed 5th DPT and animal completely recovered by 16th DPT. After 7th DPT, no parasite could be detected in RBCs. All haematological parameters came under the normal range at 14th DPT. Buparvaquone is the most effective drug known for treatment of tropical bovine theileriosis (Gupta, 2017; Nampoothiri, 2021). This is in accordance with findings of Islam *et al.* (2017) who also used Buparvaquone along with supportive therapy for the successful treatment of theileriosis in calf. Buparvaquone, a second-generation hydroxynaphthoquinone, is highly effective drug that eliminates various developmental stages of *T. annulata* from both erythrocytes and lymphocytes and helps in improvement of the animals from clinical form of the disease and thus make it a drug of choice (Gupta *et al.*, 2020).

CONCLUSION

Bovine tropical theileriosis in a calf can be managed with Buparvaquone, oxytetracycline along with supportive therapy.

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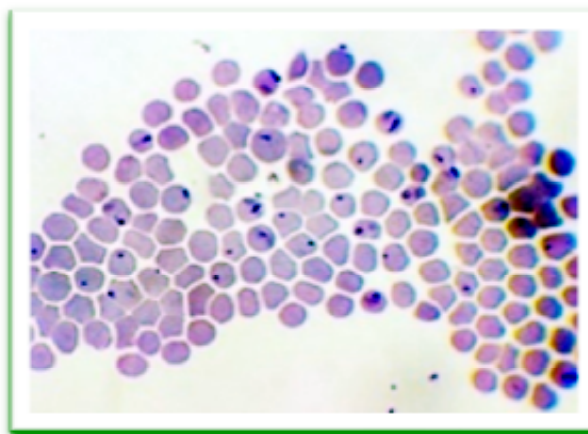


Fig. 2: *Theileria* spp. in erythrocytes

Table 1: Complete blood count of the calf infected with theileriosis

Parameters	0 th day	7 th day	14 th day
Hb (g/dl)	6	8	11
PCV (%)	21	26	29
TEC (Million/ μ l)	3.8	4.3	5.6
TLC (Thousand/ μ l)	7.9	5.8	6.5
MCV (fl)	55.2	60.4	51.7
MCH (pg)	15.7	18.6	19.6
MCHC (g/dl)	28.5	30.7	37.9
Lymphocyte %	19	35	52
Neutrophil %	70	54	39
Eosinophil %	3	4	4
Monocyte %	8	7	5

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REFERENCES

- Bhatia, B. B. and Shah, H. L. (2001). Protozoa and Protozoan Diseases of Domestic Animals. New Delhi: ICAR Publication, Pp. 148–158.
- Bradford, P. S. and Smith, D. (1990). Large Animal Internal Medicine. The CV Mosby Company, St. Louis, Baltimore, Philadelphia, Toronto. 5th ed., (35), Pp 952-953.
- Godara, R., Sharma, R. L. and Sharma, C. S. (2010). Bovine tropical theileriosis in a neonate calf. *Tropical Animal Health and Production*, 42(4): 551-553.
- Gupta, S. (2017). Tropical theileriosis associated ophthalmopathy in a calf: a case report. *The Journal of Bombay Veterinary College*, 22: 71-72.
- Gupta, R., Agrawal, A., Pathak, M., Singh, R., Rai, V. and Singh, A. (2020). Efficacy of bupravquone in bovine theileriosis in Haryana. *Journal of Entomology and Zoological Studies*, 8(1): 1146-1147.
- Islam, S. T., Dar, R. R., Sheikh, A. A., Dogra, P., Gupta, R., Patel, P. and Wani, J. M. (2017). Theileriosis in a calf: A case study. *IJCMAS*, 6: 1400-1404.
- Morrison, W.I. (1998). Theileriasis. In: The Merck Veterinary Manual. 8th Edn. Ed S. E. Aiello. Philadelphia, Merck, Pp 31-33.
- Nampoothiri, V. M. (2021). Theileriosis in cattle: Treatment and management. *International Journal of Veterinary Sciences and Animal Husbandry*, 6(1): 1-3.
- Radostits, O. M., Gay, C.C., Hinchcliff, K.W. and Constable, P.D. (2007). Veterinary Medicine. 10th Edn., Spain, Pp 432-434.
- Soulsby, E. J. L. (1982). Helminth, Arthropods and Protozoa of Domesticated Animals. 7th Edn. ELBS and Bailliere Tindall, London, 381p.

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