

## Successful Recovery in *Theileria annulata* induced corneal opacity in crossbred heifer

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### Abstract

A case of corneal opacity induced by bovine tropical theileriosis (BTT) in 15 month old female crossbred heifer was presented at Teaching Veterinary Clinical Complex (TVCC), DUVASU, Mathura with the history of anorexia, exophthalmia, impaired vision and tick infestation. On clinical examination, notable signs were high fever (105.8°F), slightly pale mucus membrane, cloudiness in eye and enlarged pre-scapular lymph nodes. Lymph node biopsy, blood smear examination confirmed BTT infection in cross breed heifer. Ocular, anaemia and other complications of crossbred heifer was resolved successfully with treatment of single dose of buparvaquone @ 2.5 mg/kg BW deep IM and hematinic along with supportive therapy.

**Keywords:** Bovine tropical theileriosis, Buparvaquone, Corneal Opacity, Exophthalmia

Bovine tropical theileriosis (BTT), caused by an obligate intracellular apicomplexan blood parasite *Theileria annulata*, poses major threat to dairy animals of India (Tuli *et al.*, 2015). *Hyalomma anatolicum*, the three-host tick, has been usually implicated in transmission of *T. annulata*. (Taylor *et al.*, 2007). The most noticeable symptoms of BTT are high fever. (40.5–41.5 °C), laboured breathing, inappetence, cessation of rumination, enlargement of regional superficial lymph nodes, lacrimation, cachexia, conjunctivitis, anemia and profound leucopenia (Khan *et al.*, 2011 and Saini *et al.*, 2018). Prompt accurate diagnosis in theileriosis prone areas is considered necessary in order to minimize endemicity of the disease. The restricted detection limit of microscopy of Giemsa stained blood smear, xenodiagnosis, and serological diagnosis such as complement fixation test (CFT), indirect fluorescent antibody tests, ELISA etc. necessitates the use of molecular assays such as PCR to detect a small amount of parasite DNA present in blood. Although *T. annulata* induced corneal opacity cases had been documented (Joshi *et al.*, 2017), however, these cases are rarely encountered in regular practice (Singh *et al.*, 2015). The present study reports unique case of *T. annulata* induced corneal opacity in 7 month old female crossbred heifer.

A 15 month old female crossbred heifer was presented to the Teaching Veterinary Clinical Complex (TVCC) DUVASU, Mathura with the complain of anorexia, exophthalmia, impaired vision, tick infestation, prominent cloudiness in eyes and weakness for the last

five days. The clinical examination revealed pyrexia (105.8°F), the presence of enlarged prescapular lymph nodes (Fig. 1), tachycardia (84 beats per minutes) and slight pale mucus membrane. The blood profile of calf was 7.1 g/dl haemoglobin,  $16.2 \times 10^3/\mu\text{l}$  TLC and 22.1 % PCV indicating progressive anaemia. This clinical view pointed towards the heamoprotozoan infection. Hence, blood sample was collected from the ear tip of calf and thin blood smears were prepared. The smears were air-dried, fixed with methanol, stained with 10 % Giemsa stain and examined under oil immersion objective of microscope (Soulsby, 1982). The microscopy of Giemsa stained blood smears revealed signet ring-shaped piroplasms in erythrocytes (Fig 2).

Major clinical complications observed during ophthalmic examinations were profuse bilateral lacrimation, bulging eyes, supraorbital oedema, cloudy eyes, corneal opacity (Fig 3) and impaired vision.

Lymph node aspiration was also done for examining the presence or absence of Koch blue bodies (KBB) Fig.4.

The crossbred heifer was treated with the Buparvaquone (Butalex, Zydus Animal Health Ltd) @ 2.5 mg/kg body weight deep IM single dose in cervical region. The concurrent supportive therapy with OTC-LA one dose of long acting oxytetracycline (Oxytetracycline-LA, Zydus Animal Health Ltd.) @ 20 mg/kg was given intramuscularly at alternate days, Melonex Plus (Intas Pharmaceuticals Ltd.) @ 0.5 mg/kg intramuscularly, Avilin (MSD Animal Health, India) 0.5mg mg/kg intramuscularly and Hematinic (Ferikind Vet, Mankind

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Fig. 1. Enlarged Prescapular Lymph Nodes



Fig. 3. Corneal Opacity in Right Eye

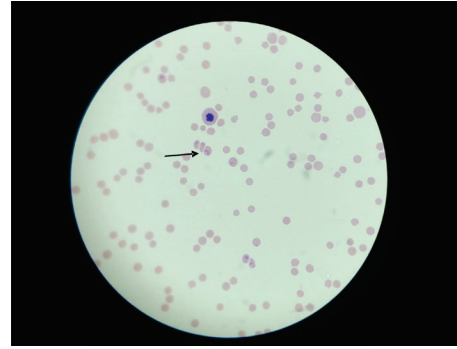


Fig. 2. Signet ring piroplasms in RBCs

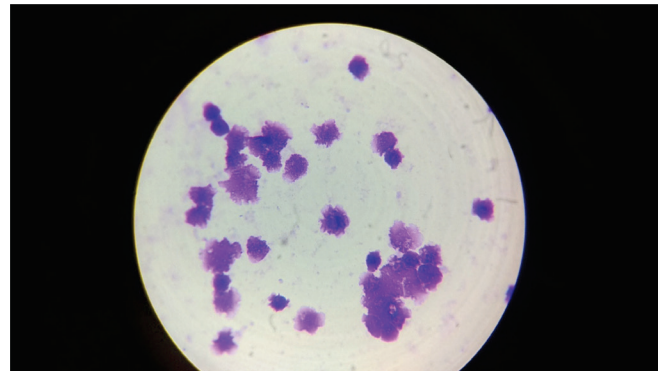


Fig. 4. Koch blue bodies in lymphoblast

Pharma Ltd.) at the rate of 20 ml orally in a day was also instituted. Inj Neomac 2ml S/C was also prescribed in order to control ticks. The crossbred heifer was also treated with 3 ml Tribivet-M intramuscularly after subsiding of fever as level of acute phase protein during fever usually remain high and administration of Vitamin B complex also escalates acute phase protein level. Hence, Vitamin B complex is generally not indicated at the time of pyrexia. As the calf recovered, then blood sample was collected and re-screened for Hb, PCV, erythrocytic piroplasms of *Theileria* and blood picture revealed that there is improvement in the Hb 7.9 g/dl, TLC  $9.8 \times 10^3/\mu\text{l}$  and no piroplasm in RBCs were found.

The presence of intra-erythrocytic piroplasms in Giemsa stained blood smear, Koch blue bodies (KBBs) in lymph node smear examination directed towards theileriosis which was in concurrence of results of Gupta *et al.* (2004), who diagnosed theileriosis in 7 days old bovine calf on parallel ground basis. The crossbred heifer was anaemic as *Theileria* induced anemia occur as a result of erythrophagocytosis and consequent removal by reticulo-endothelial system (Singh *et al.*, 2001). The unusual theileria induced corneal opacity cases may be due to the invasion of cornea, iris and lens by leucocytes

(Irvin and Mwamachi, 1983). In early infection of theileriosis, macroschizonts multiplication occurs inside the lymphocyte and consequentially lymphoid hyperplasia and enlargement of superficial lymph nodes results (Jabbar *et al.*, 2008). The crossbred heifer was infested with *Hyalomma* spp. which in turn suggested that *Hyalomma* is implicated in transmission of *Theileria*. Buparvaquone impedes the mitochondrial electron transport chain of *Theileria* parasites (Hudson *et al.*, 1985) that's why Buparvaquone is usually indicated as an effective and specific treatment for theileriosis. The calf recovered with aforesaid therapy which was in accordance with previous findings where triumphant recovery from theileriosis infection were observed with use of Buparvaquone along with supportive therapy (Joshi *et al.*, 2015; Saini *et al.*, 2018). Recovery of crossbred heifer from anaemia may be due to synergistic efficacy of buparvaquone and hematonic against tropical theileriosis (Sharma *et al.*, 2010). Vitamin B complex was administered after recovery from fever as the level of acute phase protein during fever usually remain high and administration of Vitamin B complex also escalates acute phase protein level. Hence, Vitamin B complex is generally not indicated at the time of pyrexia. Further, crossbred heifer recovery from theileriosis was

evident with the absence of intra-erythrocytic piroplasms.

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