

Concurrent Infection of Theileriosis and Coccidiosis in a Crossbred Cattle: A Case Report

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Abstract

A six-year-old non pregnant crossbred cow was presented with a history of high fever (105 °F), severe tick infestation, selective feeding, weakness, straining during defecation and drastic reduction in milk production. Clinical examination revealed a body condition score (BCS) of 3.0, pale mucous membranes, normal rectal temperature, impacted rumen and nothing abnormal detected on per rectal examination. Tentative diagnoses included theileriosis, ketosis and parasitic infestation. Hematological analysis revealed severe anemia (Hb: 3.3 g/dl) with microscopic examination of Giemsa-stained blood smear showed typical signet ring-shaped intraerythrocytic piroplasm of *Theileria annulata*. Urine sample was negative for presence of ketone bodies. Fecal examination demonstrated the presence of coccidian oocysts. The case was diagnosed to be of concurrent theileriosis and coccidiosis. Therapy was initiated with oxytetracycline (10 mg/kg body weight, intravenously) along with sulfadiazine trimethoprim @ 30 mg/kg body weight, intramuscularly, once daily for 5 days for coccidiosis and other supportive treatment was given, while buparvaquone was withheld initially due to risk of oxidative stress in severely anemic animals. By day 10, hemoglobin increased to 4.9 g/dl, no parasitic ova seen on fecal examination and buparvaquone (2.5 mg/kg body weight, intramuscularly, single dose) was administered with supportive therapy. By day 21, blood smear were negative for *Theileria* piroplasms, with hemoglobin improving to 5.2 g/dl. Clinical recovery was evident, with improved appetite, activity, and gradual weight gain. This case emphasizes the importance of considering concurrent parasitic infections in cattle, as timely diagnosis and sequential therapeutic interventions significantly enhance prognosis and recovery.

Keywords: Buparvaquone, Coccidiosis, Piroplasms, *Theileria annulata*.

Introduction

Tropical theileriosis caused by *Theileria annulata* is one of the economically important diseases imparting huge economic losses to the dairy industry. In India, predicted annual economic loss due to theileriosis is estimated to be US \$1295 million (Narladkar 2018). Disease is transmitted by ticks and is characterized by continuous fever, decreased milk production, swollen lymph node and anemia. Diagnosis can be made by microscopic examination of a Giemsa-stained blood smear, demonstrating the characteristic signet ring-shaped piroplasms within erythrocytes (RBCs) (Charaya *et al.*, 2016). For treatment, Buparvaquone is considered as a drug of choice and exerts its inhibitory action by binding to the ubiquinone binding pocket of parasite cytochrome *b* protein and inhibiting parasitic oxidation (Hacilarlioglu *et al.*, 2025).

Coccidiosis in cattle is caused by intestinal protozoan belonging to genus *Eimeria* spp. Primarily, disease occurs mainly in young animals and can occur in adult animal with waning immune protection resulting from other pathogen infection (Reddy *et al.*, 2013). In adult, coccidiosis occurs in inapparent subclinical forms and signs are deceptive or inconclusive for the tentative diagnosis. The most clinical signs observed are foul smelling, dark, and watery feces. Diagnosis of coccidiosis can be done by direct smear method, floatation technique for the presence of parasitic ova (Zajac and Conboy, 2006).

Co-infection between pathogens can affect susceptibility to other pathogens and, therefore, can alter host immune responsiveness (Mabbott, 2018). Poor managemental practices, environmental stress and compromised immunity are the risk factors leading to haemoprotozoan and gastrointestinal parasitic diseases. The present case report highlights the importance of considering the concurrent infections and consideration of oxidative stress in treatment of severely anemic animals.

Case History and Observations

A six-year-old non pregnant crossbred cow was presented with a history of high fever (105 °F), severe tick infestation, selective feeding, weakness, straining during defecation and drastic reduction in milk production (25L to 7L). Clinical examination revealed a body condition score (BCS) of 3.0, pale mucous membranes, normal rectal temperature, impacted rumen and nothing abnormal detected on per rectal examination. Based on the clinical signs and preliminary findings, a tentative diagnosis of theileriosis, ketosis, and parasitic infection was considered. Blood samples were collected aseptically from the jugular vein in ethylene diamine tetra acetic acid (EDTA) vials. Blood samples were subjected for haematology examination. Slide was prepared and stained with Giemsa stain. Stained blood smears were examined under 100 × objective magnifications. Naturally voided urine sample was collected in urine collecting container and screened for the presence of ketone bodies by dipstick method. Faecal examination was done for the presence of egg/oocyst by sedimentation and floatation test.

Hematological analysis revealed severe anemia (Hb: 3.3 g/dl & TEC: 2.25 (million/mm³), while other hematological parameters were within normal limits. Microscopic examination of Giemsa-stained blood smear showed typical signet ring-shaped intraerythrocytic piroplasm of *Theileria annulata* (Fig. 1).



Fig. 1: Microscopic view at 500X magnification of Giemsa-stained blood smear showing typical signet ring-shaped intraerythrocytic piroplasm of *Theileria annulata*

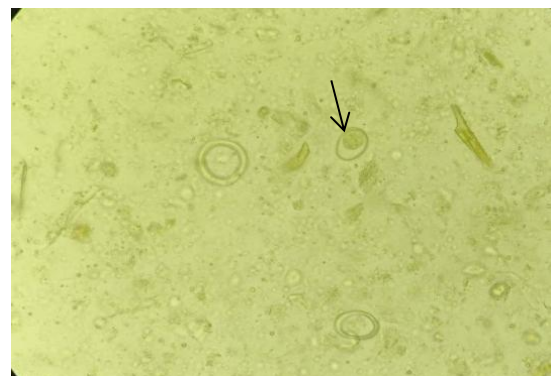


Fig. 2: Fecal examination demonstrated the presence of coccidian oocysts

Urine sample was negative for presence of ketone bodies. Fecal examination demonstrated the presence of coccidian oocysts. The case was diagnosed to be of concurrent theileriosis and coccidiosis. The treatment was advised as per the diagnosis and re-sampling was done at weekly interval till 3rd week and last sampling was done on day 55 after treatment.

Treatment and Discussion

Therapy was initiated with oxytetracycline (10 mg/kg body weight, intravenously) along with sulfadiazine trimethoprim @ 30 mg/kg body weight, intramuscularly, once daily for 5 days for coccidiosis and other supportive treatment (antioxidant and iron supplementation) was given, while buparvaquone was with-held initially due to risk of oxidative stress in severely anemic animals. Sulfadiazine trimethoprim was given as a treatment for coccidiosis and oxytetracycline was given to arrest the growth of theileria parasite till the administration of drug of choice. It has been proven in past that buparvaquone leads to oxidative stress and increase lipid peroxidation which can further impact the blood parameter of animal (Isik *et al.*, 2018). By day 10, hemoglobin increased to 4.9 g/dl, no parasitic ova seen on fecal examination and buparvaquone (2.5 mg/kg body weight, intramuscularly, single dose) was administered with supportive therapy. By day 21, blood smear were negative for *Theileria* piroplasms, with hemoglobin improving to 5.2 g/dl. Clinical recovery was evident, with improved appetite, activity, and gradual weight gain. Similar to present case report, Reddy *et al.*, 2013 used sulphonamide drug (sulphamidine) for treating adult cattle and reported clinical cure in five out of seven affected animals.

Repeat sampling on day 55 showed further improvement in Hb to 7.7g/dl (Table 1) with no sign of illness and restoration of milk yield. Concurrent infection with two parasites can result in a synergistic detrimental effect, leading to increased disease severity. In the present case, infection with *Eimeria* spp. alone would be unlikely to cause clinical disease in an adult cow. However, the immunosuppressive effects of *Theileria annulata* may have predisposed the animal to clinical coccidiosis caused by *Eimeria* spp. Furthermore, the favorable response to specific therapeutic management, along with the restoration of appetite and milk production, supports the diagnosis of concurrent infection.

Table 1: Significant improvement in hematological profile of cattle after treatment for concurrent theileriosis and coccidiosis.

Parameters	Day 1	Day 10	Day 21	Day 55
Haemoglobin (gm%)	3.3	4.9	5.2	7.7
PCV (%)	13.4	18	19	24
TEC(Million/mm ³)	2.25	2.97	4.45	4.54
TLC (thous/mm ³)	11.83	5.35	4.6	7.91
DLC				
Neutrophils (%)	56	55	30	68
Lymphocytes (%)	40	42	60	30
Monocytes (%)	4	3	4	2
Eosinophils (%)	-	-	6	-
Platelets (thousand/mm ³)	274	288	378	197

Conclusion

The present case emphasizes the importance of considering concurrent parasitic infections in cattle, as timely diagnosis and sequential therapeutic interventions significantly enhance prognosis and recovery.

Contribution by Authors

Aman Singh and Gaurav Charaya handled the case, laboratory examination was done by Avni Chauhan and Praveen Kumar. Treatment feedback, resampling and processing of sample was done by Aman Singh and Avni Chauhan. The initial draft was prepared by Aman Singh and finalized by Gaurav Charaya and Praveen Kumar.

Conflict of Interests

There is no conflict of interest.

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