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Concurrent infections of theileriosis and amphistomiasis in a cross breed calve and its therapeutic management: A case study

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Abstract
An 8 month old crossbred female calve with a history of incomplete deworming, anorexia, weakness, fever, respiratory distress, deep yellow urine and diarrhoea was presented to the Veterinary Clinical Complex, CVSc. & A.H., RK Nagar, Tripura. On clinical examination, the calf revealed paper white conjunctival membrane, ruminal atony, soiled hind quarters and enlarged pre-scapular lymph node. Haematological examination revealed a lower level of Haemoglobin (4.8 g/dl), Total RBC (2.2 million/cmm) and PCV (11.4%). The blood smear and faecal examination revealed the presence of *Theileria orientalis* piroplasm and amphistome eggs. The animal was successfully treated with injection Buparvaquone @ 2.5 mg/kg BW I/M single dose, Injection Oxytetracycline-LA, deep I/M @ 20 mg/kg BW at every 48 hours interval on three occasions, Bolus oxyclozanide @ 15 mg/kg BW orally for 3 days along with supportive drugs.

Keywords: Amphistome, Buparvaquone, Calve, Theileriosis, Oxytetracycline

Introduction
Bovine tropical theileriosis is a major tick-borne haemo-parasitic disease of cattle and is associated with high morbidity and mortality. Though all breeds of cattle are equally susceptible to theileriosis but exotic, crossbred cattle as well as young calves are more affected by this disease. The disease is mainly caused by *Theileria annulata*, *T. parva* and *T. orientalis* in cattle in India and transmitted by ticks of genera *Hyalomma* and *Rhipicephalus* (Krishnamoorthy *et al*., 2021) [10]. The clinical signs include pyrexia (Up to 107°F), dullness, anorexia, enlarged superficial lymph nodes, ruminal atony, dehydration, salivation, lacrimation and discharge from nostrils. The clinically recovered animal may act as carriers with long-term persistent infections (Brown, 1990) [4]. The disease has a profound effect on the haematological values of the animals and is responsible for causing huge morbidity and mortality in the cattle population. Confirmatory diagnosis of theileriosis is mainly based on history of tick infestation, clinical signs and microscopic examination of Giemsa-stained thin blood smears of the suspected animal (Aktas *et al*., 2006) [1] or PCR. Among several trematodes affecting cattle, amphistomes have recently emerged as an important cause of economic loss to farmers due to mortality and low productivity (Kilani *et al*., 2003) [9]. In ruminants, clinical symptoms associated with amphistomiasis were diarrhoea, loss of body condition, rough hair coat, dullness, weakness, loss of appetite, intestinal haemorrhages, anaemia and intermandibular swelling (Blood *et al*., 1983) [3]. Diagnosis of amphistomiasis at field level was done mainly by faecal examination. This article describes a case of concurrent infection of *Theleria* and amphistomiasis along with its successful therapeutic management using Buparvaquone, Oxytetracyline and Oxyclozanide.

Case history and observations
An 8 month old crossbred female calves with approx. 52 kg was presented. to the Veterinary Clinical Complex, CVSc. & A.H., R.K. Nagar,

Tripura with a history of incomplete deworming, anorexia, weakness, fever, respiratory distress, deep yellow urine and diarrhoea. Clinical examination of the animal revealed paper white conjunctival membrane (Figure 3), ruminal atony, soiled hind quarters and enlarged pre-scapular lymph node. Heavy tick infestation was also observed. On the basis of clinical examination, blood sample was collected aseptically from jugular vein in a sterilized EDTA vial for haematological examination as well as for haemo-parasite detection. Haematological examination revealed Haemoglobin (4.8 g/dl), Total RBC (2.2 million/cmm), PCV (11.4%), Total WBC (7250/cmm), DLC (Neutrophil-71%, Lymphocyte-21%, Ecsinophil-5%, Monocyte-3% and Basophil-0%), Platelet count (6120/cmm). MCV, MCH and MCHC were 66.82 fL, 21.77 pg and 32.29 g/dl, respectively. The blood smear was subjected to Giemsa staining and observed under light microscopy, which revealed the presence of *Theileria orientalis* piroplasm (Fig. 1). Faecal examination by sedimentation technique revealed the presence of Amphistome eggs (Fig.2). On the basis of history, clinical signs and laboratory findings the condition was diagnosed as concurrent infection of Theileriosis and Amphistomiasis.

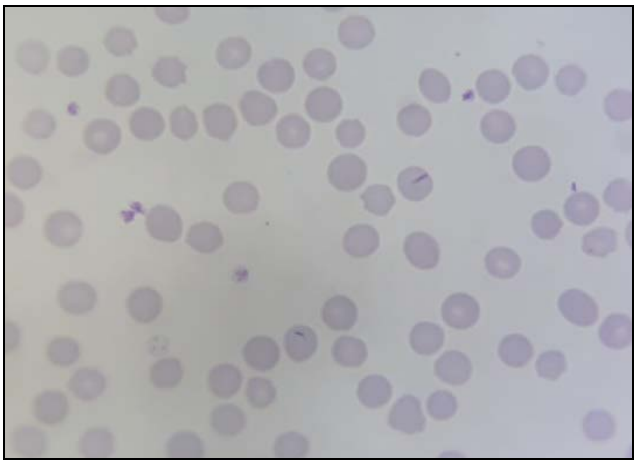

Fig 1: *Theileria orientalis* piroplasm in the RBC

Fig 2: Amphistome egg

Therapeutic management

The animal was treated with a single dose of injection of Buparvaquone @ 2.5 mg/kg BW I/M, injection of Meloxicam @ 0.2 mg/kg BW I/M for 3 days and injection of Pheniramine Maleate @ 0.5 mg/kg BW I/M,, injection of Oxytetracycline-LA, deep I/M @ 20 mg/kg BW at every 48 hours interval on three occasions along with supportive drugs eg. Injection Feritas @ 1.0 ml I/M every alternate day for ten occasions and Injection Tribivet 2ml I/M for 5 days. Amphistomiasis was treated by giving Bolus oxyclozanide @ 15 mg/kg BW orally for 3 days. Following the fourth day of treatment, the animal's health began to improve. The calve started eating, the temperature and urine colour became normal, the diarrhoea subsided and the conjunctival mucous membrane turned to pink in colour. The animal apparently became normal after the 10th day of treatment.

Fig 3: Conjunctival mucous membrane on Day 0

Fig 4: Conjunctival mucous membrane on Day 4 of treatment

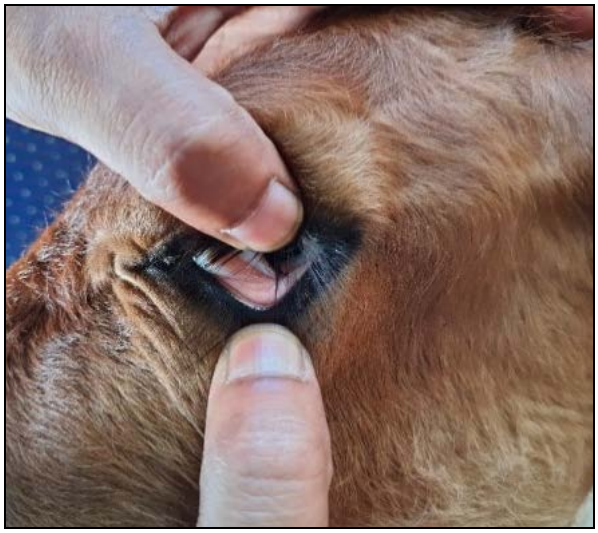

Fig 5: Conjunctival mucous membrane on Day 10 of treatment

Discussion

Theileriosis is one of the most significant arthropod-borne blood protozoan illnesses that cause morbidity and death, particularly in calves, those frequently afflicted during the prenatal period. In the present case, an eight months old calve was infected with *Theileria orientalis*. Various workers have reported that young calves are more susceptible to Theileriosis (Gupta *et al*., 2004) [6]. The haematology of the present case revealed that the total erythrocyte count, haemoglobin concentration and PCV mean values were significantly low as compared to normal levels suggestive of anaemia. These observations were in parallel with Hasanpour *et al*. (2008) [7]. Anemia in Theileriosis might be because of erythrophagocytosis which causes destruction of RBC's infected with theileria schizoints (Uilenberg, 1981) [12]. However, increased level of activated complement products (Omer *et al*., 2002) [11] and removal of piroplasm infected erythrocytes by macrophages in the RE system have also been suggested as a cause of anemia (Campbell *et al*., 1999) [5]. Several clinicians successfully used the combination of buparvaquone and oxytetracycline as a curative drug for the treatment of theileriosis in cattle (Bhatt *et al*., 2012; Kachhawa *et al*., 2016) [2, 8]. Oxyclozanide is considered as the drug of choice for treating amphistomiasis in cattle and been successfully used by many workers (Yogeshpriya *et al*., 2017) [13].

Conclusion

In conclusion, it was reported that a concurrent infection of theileriosis and amphistomasis in a calf was successfully treated with Buparvaquone, Oxytetracycline and Oxyclozanide. Since haemoprotozoan diseases are causing devastating losses to the livestock industry and pose major constraints to the dairy industry in India as well as throughout the world, therefore, following appropriate treatment regime along with awareness to the farmers are utmost important regarding controlling of these tick-borne infections in cattle.

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Conflict of Interest: Not available

Financial Support: Not available

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