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Therapeutic management of concurrent infection of coccidiosis and theileriosis in a calf

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Abstract

A cross-bred female calf of about one month old was presented with high fever, dull, depressed haemorrhagic diarrhoea and inappetance from last two days at Teaching veterinary clinical complex (TVCC), Post Graduate Institute of Veterinary Education & Research, Jaipur in the month of December 2018. Un-sporulated oocysts in stool sample, 5500 oocysts per gram (OPG) count of stool sample, morphological characteristics of artificial potassium dichromate induced sporulated oocysts and micrometry pointed towards heavy infection of *Eimeria zuernii* in calf concurrent infection of theileriosis was ruled out with the presence of piroplasma in peripheral blood smears and Koch Blue body in pre-scapular lymph node biopsy. The calf was treated successfully with Sulphadiazine and trimethoprim, buparvaquone and supportive therapy. The calf was recovered gradually and started normal feeding 6th day onwards.

Keywords: winter coccidiosis, theileriosis, calf, jaipur, buparvaquone

Introduction

Theileria annulata, an intracellular obligate haemoparasitic protozoan, is implicated in causing bovine tropical theileriosis (BTT) in both domestic and wild animals of tropical and subtropical parts of world. Theileriosis transmitted through the bites of *Hyalomma anatolicum anatolicum* accounted for mortality especially in calves during the perinatal period. The arthropod borne hemoparasitic diseases are of great economic impact on livestock affecting 80% of the world cattle population and causes economic loss due to morbidity and mortality (Kasozi *et al.*, 2014) [6]. The disease usually expressed with common clinical signs of high fever, anorexia, conjunctival petechia, enlarged lymph nodes, and anaemia, diarrhoea and dysentery are also associated with later stages of infection (Radostits *et al.*, 2007) [12]. The major clinical manifestations of experimental and natural acute theileriosis are pyrexia, generalized lymphadenopathy, anaemia, anorexia, cachexia, respiratory distress, petechiae in conjunctiva, oral and nasal mucosa and unilateral or bilateral exophthalmia (Sengupta *et al.*, 1993; Branco *et al.*, 2010; Sudan *et al.*, 2012) [14, 2, 17]. Recently Saini *et al.* (2019) [13] reported bovine theileriosis in young crossbred calf aged below one month.

Coccidiosis is most frequently observed in calves of one-month to one-year age kept under intensive rearing system than in those on pastures. Coccidian, an intracellular sporozoan protozoa belonging to family Eimeriidae, usually set up subclinical infection in young calves of low immuno-competency. However, *Eimeria zuernii* and *Eimeria bovis* are implicated in causing catarrhal or haemorrhagic diarrhoea which in turn consequence to mortality in many case (Nisar *et al.*, 2013) [10]. Infection of *E. zuernii* is more common in winter (Geurden *et al.*, 2005) [4]. Prime route of transmission of coccidiosis is faecal-oral route. Sporulated oocyst, an infective stage, invade in the cells of gut lining, multiply there, results in destruction of the cell and impaired normal digestive functions (Fig 1). Loss of electrolytes and water leads to persistent dehydration and death (Soulby, 1982) [16].



Fig 1: Calf with bloody diarrhea

Most common clinical complications of coccidiosis are inappetance, weakness, weight loss, diarrhoea and anaemia (Levine, 1985) [7]. Severity of clinical disease depends upon parasitic loads and infection before achieving immune-competency of young calves while infection may be set up in adult animals only as a result of chronic exposure of parasite so adult animals serve as a source of infection to susceptible young animals (Meenakshi *et al.*, 2002; Abebe *et al.*, 2008) [8-1]. Early diagnosis of infection and triumphant recovery from infection via early institution of therapy is needed in order to check further transmission of disease. The present case documents concurrent infection of theileriosis and coccidiosis in crossbred female calf of one month age and its effective therapeutic management from Jaipur.

History, clinical examination and diagnosis work-up

One month-old crossbred female calf was presented at Teaching Veterinary Clinical Complex (TVCC), Post Graduate Institute of Veterinary Education & Research, Jaipur in the month of December with history of high fever, dull, depressed diarrhoea, haematochezia, dysentery, profuse bleeding from rectum, smudging of perineum, tenesmus and inappetance from last two days without institution of any therapy. Thorough physical and clinical examination revealed that calf was suffering from dehydration, bilateral pre scapular lymphadenitis, pyrexia (rectal temperature 103.7°F), tachycardia (129 beats/minute), increased in respiration rate (30/minute) and anemia (6.6 gm/ dl haemoglobin level; packed cell volume 20%). This clinical view pointed towards the haemoprotozoan infection. Hence, blood sample was collected from the ear tip of calf for ruling out the presence of any piroplasms in red blood cells and peripheral blood smears were made and stained with Giemsa stain after fixing with methanol. Giemsa stained smears were examined under oil immersion objective of microscope for the presence of any haemoprotozoan. Thin blood lymph smears were prepared and then fixed in methanol followed by staining with Giemsa stain and examined under oil immersion lens as per method described by (Coles, 1986) [3]. Peripheral blood examination and the presence of KBB in pre-scapular lymph node smear examination substantiate theileriosis infection in calf.

Stool examination revealed the presence of un-sporulated oocysts in stool sample (Fig 2). Oocysts per gram (OPG) count of the sample found to be 5500 of the stool which in turn reflect severe infection.

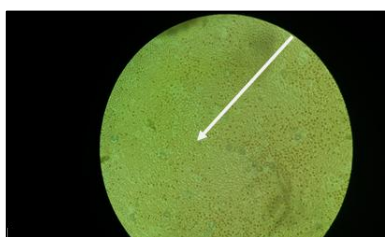


Fig 2: Un-sporulated oocysts in stool sample

Fecal sample was treated with 2.5% Potassium dichromate ($K_2Cr_2O_7$) in petridish and the petridish was kept in Biological Oxygen Demand (BOD) incubator at a temperature of $37\pm 2^\circ C$ for 7-10 days in order to induce sporulation artificially. $K_2Cr_2O_7$ solution in petridish was changed regularly at 24 hours interval. Morphological features (shape, colour, form index, presence or absence of micropyle and its cap, presence or absence of residual, polar and stieda bodies) of sporulated oocysts under $400\times$ magnifications, size measured via micrometry, infection occurrence in winter pointed towards *Eimeria zuernii*. (Fig 3, 4).

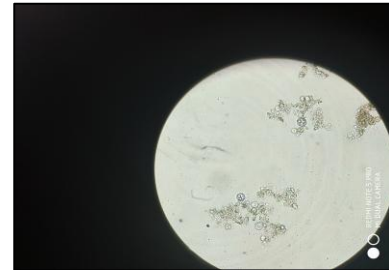


Fig 3: Sporulation of oocyst artificially



Fig 4: Sporulation of oocyst artificially.

Treatment, Post-treatment outcome and discussion

The calf was treated with injection Biotrim 03 ml intramuscular (Sulphadiazine and Trimethoprim, Zydus, AHL) for 3 days to control the infection, injection Zubion 02 ml intramuscular (Buparvaquone, Intas Animal Health) @ 2.5 mg/kg b.wt single dose was given, injection Melonex Plus, 1.5 ml intramuscular (Meloxicam and Paracetamol, Intas Animal Health) @ 0.2 mg/kg b.wt. and injection Flagyl 400 mg I/V (Metronidazole) @ 10mg/kg b.wt. twice in day was given to treat diarrhoea and other anaerobic infection. To prevent dehydration and electrolyte imbalance, injection Normal saline (NS) @ 250 ml and Ringers lactate (RL) @ 250 ml given for 3 consecutive days was instituted intravenously (I/V). Injection Botropase 01 ml I/V (Haemocoagulase, Juggat Pharma) was given in order to check rectal bleeding. Injection Feritas 01 ml Intramuscular (Intas Animal Health) at alternate days was given to calf to restore normal blood profile. After subsiding fever, injection Tribvet 1.5 ml intramuscular (Intas Animal Health) was given to calf. The calf showed absolute recovery with the above line of treatment. There was no blood or straining while passing stool.

Vitamin B complex escalates acute phase protein level and at the time of pyrexia, level of acute phase protein remained high. Hence, Vitamin B complex is generally prescribed after subsiding fever.

Occurrence of coccidiosis is more frequent during first 3 months of life of calf (*i.e.* before achieving complete immune-

competency and *Eimeria zuernii* infection is more frequent in winter. Young calves are also more prone to theileriosis in comparison to old (Mudgal, 1993; Sharma and Nichani, 1990; Grewal, 1992)^[9, 15, 5]. Hence, the calves should be given proper immuno-prophylactic measures immediately after birth. Concurrent infection of coccidiosis and theileria intensified clinical complications in tune to immuno-compromised status which was resolved successfully after institution of directed therapy and supportive therapy. Compromised immune status as consequence of environmental stress, high parasitic load with respect to limit host due to shortage of water shed escalates disease occurrence in winter months. Proper feeding of colostrums and balanced diet, hygiene and sanitation in calf shed, appropriate immune-prophylaxis measures and immune booster are needed in order to prevent perinatal infection and coccidiosis in younger age. Isolation of sick animal and avoidance of contact of feed and water supply with faeces may help in minimizing further outbreak (Radostits, 2005)^[11]. Prompt diagnosis, tick control, early therapeutic management and vaccination of Raksha vac-T in disease prone area may help in control of theileria infection (Saini *et al.*, 2019)^[13].

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