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Therapeutic management of theileriosis in young Deoni calves

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Abstract

Bovine *theileriosis* is a tick-borne disease caused by protozoan parasite of the genus *Theileria*. Seven deoni calves affected with *Theileriosis*. The calves shows clinical signs such as pyrexia, anorexia, anemia, pale mucus membrane, enlarged lymph node, general weakness, lameness and difficulty in getting up etc. The diagnosis was done by blood smear examination and lymph node smear examination. Animals were treated with buparvaquone injection along with symptomatic and supportive therapy. The infection can be fully cured with early detection, appropriate medication and control of ticks.

Keywords: Therapeutic management, theileriosis, Deoni calves

Introduction

Theileria annulata, a protozoan parasite of cattle and domestic buffaloes, is transmitted by ticks of the genus *Hyalomma* and causes a disease named Mediterranean or tropical *theileriosis* (Mirzaei, 2007) [6]. On the pasture, ticks can remain infected for upto two years. Animals that are vulnerable to sporozoites are exposed through the saliva of feeding ticks. Once the tick clings to its host, *theileria* develop and emerge into the saliva. *Theileria*-infected animal's spleen, lymph nodes, liver and entire blood contain schizonts; injected schizonts can spread easily among cattle. One of the main obstacles to livestock upgrading projects in the Indian subcontinent is calf mortality from *theileriosis*. (Godara *et al.*, 2009; Sudan *et al.*, 2012) [9, 10]. In neonates, *theileriosis* can present with a variety of clinical presentations, ranging from subacute to chronic or acute to peracute.

It mainly depends upon the damaging effect of the pathogen on lymphoid tissues and the host's susceptibility. A marked rise in body temperature, reaching 104- 107°F is followed by lethargy, lacrimation, nasal discharge, exophthalmia and swelling of superficial lymph nodes; hemolytic anemia is among the characteristic features of tropical *theileriosis* (Fartashvand *et al.*, 2013; Singh *et al.*, 2013) [3, 11]. Haemoprotozoan animal diseases are causing severe losses to the livestock industry and thus pose major constraints to the dairy industry worldwide (Kohli *et al.*, 2014) [5]. This case study illustrates how *theileriosis* in calves can be treated therapeutically under field conditions.

Materials and Methods

Animals

A total number of 07 calves belong to different localities in Aurad, taluka of Bidar Karnataka, were subjected to study. All animals showed clinical signs of *theileria* infection, out of them only 04 cows showed enlargement of superficial lymph nodes.

Clinical examination

A thorough clinical examination was carried out on all the calves. The signs in clinical cases of *Theileria annulata* infection were reported and recorded. From each calf ear vein, thin blood smears were made. Aspirates of lymph nodes were taken from suspected instances with enlarged superficial lymph nodes.

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Samples

Blood and lymph aspiration were collected from each calf. Blood was drawn from the vein in the ear and utilized to create blood film. Lymph node aspirates were collected from enlarged lymph nodes and used for lymph smear. Blood and lymph smears were prepared directly after collections, fixed with absolute methanol, and stained with Giemsa. Samples were collected on day '0', 5th day after treatment and 15th day after treatment.

Diagnosis and Treatment

Out of 07 presented calves, four were female and three were male. More than 75% of the infected calves displayed clinical signs of pyrexia reaching 104-107 °F, poor appetite and superficial lymph node enlargement (Fig. 1) and pallor mucous membrane (Fig. 2).

Blood smear examination revealed presence of piroplasms in the RBCs of 42.85% (3/07) calves (Fig. 3) While, Lymph node aspirate smear examination revealed presence of schizonts in mononuclear cells of 71.42% (05/07) calves (Fig. 4). Moreover, 57.14% (4/07) of calves were positive for the both piroplasms in blood smear and presence of schizonts in mononuclear cells of lymph nodes aspirate smear.



Fig 1: Enlarger prescapular lymph node



Fig 2: Pallorconjunctival mucous membrane

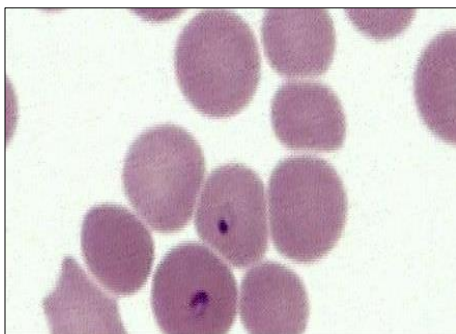


Fig 3: Piroplasms in the RBC's

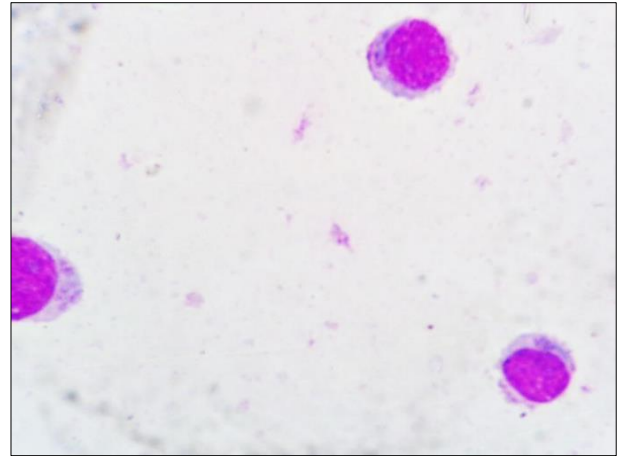


Fig 4: Schizonts in mononuclear cells

In present investigation, all the infected calves were treated with Buparvaquone (Zubion) at the dose rate of 2.5 mg/kg BW deep intramuscular injection at neck region on day '0' along with Melonex plus at a dose rate of 0.5mg/kg BW intramuscular, Avil 1ml intramuscular and Tribivet 1.5 ml intramuscular for 5 days. After the 5th day of treatment, three (03) were positive and those were repeated 2nd dose of buparvaquone (Zubion). These calves recovered with 2nd dose of buparvaquone within 15 days. After receiving a single dosage of buparvaquone, four calves recovered in five days. In the current instance, it was discovered that, when treated as soon as possible, a single dosage of buparvaquone combined with supportive therapy is effective against cases of *theileriosis*.

Discussion

The findings of this investigation indicate that some of the most prevalent clinical signs that spontaneously infected calves with *T. annulata* exhibit are lymph node enlargement, pallor mucous membrane, decreased appetite, a noticeable rise in body temperature and exophthalmia. Anemia caused by cytokine overproduction, immune-mediated hemolysis and reactive oxygen species is a significant aspect of the disease (Saleh *et al.*, 2012)^[7]. Pallid mucous membranes are a sign of anemia in calves who are affected. Since it is not confined by a parasitophorous vacuole, the changing schizont can easily disrupt the signaling pathways of host cells that control cell division and survival (Shiels *et al.*, 2006)^[8]. According to Woods *et al.* (2013)^[12], *T. annulata* primarily infects macrophages/monocytes and B-cells. It then transforms the infected host cells, causing unchecked proliferation and clonal expansion of the parasitized cell population, which causes generalized lymphadenopathy and lympho-proliferative disease in cattle. *T. annulata* infected cells also generate large amounts of inflammatory cytokines, including TNF- (Brown *et al.*, 1995)^[11]. According to Graham *et al.* (2001)^[4], this cytokine is a strong inducer of all the main clinical signs and symptoms of acute tropical *theileriosis*, including pyrexia, anemia, anorexia, muscle wasting and necrosis.

Results of the current investigation revealed that 42.85% (3/07) calves were positive for *Theileria* infection by blood film. Furthermore, 71.42% (05/07) calves with enlarged lymph nodes were positive for *theileriasis* by lymph smear, this indicates that lymph smear is the best rapid test for diagnosis of *theileriasis* in calves with enlarged lymph nodes. Similarly, Abdel-Rady revealed that, 31 cows

(25.8%) out of the examined cattle (120) were positive by blood film *Theileria* infection, and all the cows (18) with enlarged lymph nodes were positive by lymph smear *theileriasis*.

The intramuscular method of buparvaquone at a dose rate of 2.5 mg/kg body weight was found to be efficacious. The outcome matched that of Devadevi *et al.* (2018) [2]. The present study showed that in 03 calves required doses of injections for complete recovery. In contrast to the findings of Devadevi *et al.* (2018) [2], a single intramuscular dosage of buparvaquone at 2.5 mg/kg body weight demonstrated 100% recovery and removed the *Theileria* organism from the bloodstream.

According to Singh *et al.* (2013) [11], in these particular circumstances, vitamin supplementation may have helped to improve the anemia of the affected calves by reducing the oxidative damage to erythrocytes caused by *Theileria*.

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