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Therapeutic management of babesiosis in cattle

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Abstract

The health and production in domestic animals are influenced by various factors; among them parasites constitute the most important pathogenic agents. Tick-transmitted hemoparasites of the protozoan genus *Babesia* (phylum Apicomplexa) are the second most common blood-borne parasites of mammals after the trypanosomes. In worldwide, Babesiosis is one of the most important tick-borne disease caused by *Babesia* spp. occur in cattle which causes economic losses to the farming community by reducing the milk and meat production Bovine Babesiosis is characterized by high fever, hemoglobinuria, anaemia, inappetence, pink pale to pale mucous membrane, swollen lymph node and suspended rumination with mild to moderate tick infestation. Microscopic examination was advocated for detection of *Babesia* piroplasm in Giemsa stained thin blood smears. All animals were successfully treated with Diminazineaceturate @ 3.5mg/kg b.wt. Along with supportive therapy.

Keywords: Babesiosis, anaemia, hemoglobinuria, Diminazineaceturate, cattle, tick-borne

1. Introduction

Babesiosis is an important tick borne protozoan infection caused by genus *Babesia* which is clinically characterized by high fever, inappetence, emaciation, anaemia, jaundice and hemoglobinuria, occasionally diarrhoea and abortion may occur in pregnant cattle (Salem *et al.*, 2016) ^[1]. The haemoprotezoan *B. canis* is a common piroplasm affecting the erythrocytes of the dogs of India and is transmitted by the brown dog tick *Rhipicephalussanguineus* (Dantas- Torres, 2010) ^[2]. The most important species responsible for the disease in cattle are *Babesiabovis* and *Babesiabigemina* in the tropics and subtropics. Both species are tick-borne and intra-erythrocytic infections. The climatic conditions in the tropical countries including India are most congenial for the tick vector propagation. Abundance of intermediate host i.e. *Boophilus sp.* of tick, were observed as predisposing factor in the development of clinical symptoms. The tick-borne infection leads to negative impact on livestock health as well as great economic losses. Babesiosis is classified as the second most widespread blood-borne disease among animals (Homer *et al.*, 2000) ^[3] and is recently gaining increasing interest as an emerging zoonosis of humans (Homer *et al.*, 2000 and Zintl *et al.*, 2003) ^[4]. This study describes the clinical observations in *Babesia* infected cattle with successful therapeutic management.

2. History and Clinical Observations

The present study was conducted in five cross-bred cows aged between four years to six years. Animals presented with clinical signs like high fever, hemoglobinuria, anaemia, pale mucous membrane, general weakness, anorexia and tick infestation formed the material for the study. Clinical examination revealed high rectal temperature (103^oF -106^oF), swollen lymph nodes, pale conjunctival mucous membrane, hemoglobinuria and mild to moderate tick infestation (Table-1 and Fig. 1a,1b,1c,1d).

Thin blood smears were prepared using peripheral blood collected from ear vein of each cattle. Blood smears were labelled and fixed using methanol. Smears were stained with Giemsa stain at 1 in 10 dilutions for 30 minutes and examined under oil immersion objective of the microscope for the presence of intra-erythrocytic stages of hemoparasites

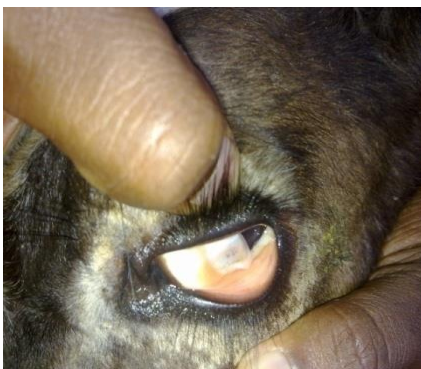
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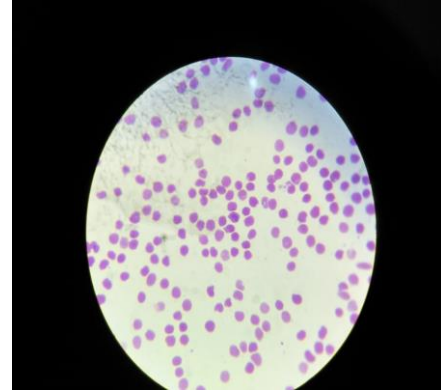
Table 1: Clinical Examination of the animals

	Animal 1	Animal 2	Animal 3	Animal 4	Animal 5
Temperature	104.2°F	104°F	105.4°F	105.2°F	104.8°F
Mucous membrane	Pale	Pale	Pale	Pale	Pale
Lymph node	Enlarged	Enlarged	Enlarged	Enlarged	Enlarged
Hemoglobinuria (coffee coloured urine)	Present	Present	Present	Present	Present

**Fig 1a:** High Fever (104.2°F)**Fig 1b:** Coffee coloured urine**Fig 1c:** Swollen lymph node**Fig 1d:** Pale mucous membrane

3. Diagnosis and Treatment

On microscopic examination, *Babesiabigemina* could be detected as pear-shaped bodies joined at an acute angle within the mature erythrocyte in the blood smear (Fig. 2)

**Fig 2:** Intra- erythrocytic stages of Babesia under light microscope

From the history, clinical signs and microscopic examination, the disease was confirmatively diagnosed as Babesiosis. All the affected animals were treated with Inj. Berenil RTU (Diminazine Aceturate) @ 3.5 mg/kg b.wt. Intramuscularly at two different sites in neck muscles on day one. Inj. Belamyl (Thiamine hydrochloride, Riboflavin, Niacinamide, Vitamin B₁₂, Liver extract) @10 ml. intramuscularly on day one.

Inj. Melonex plus (Meloxicam, Paracetamol) @ 0.5 mg/kg b.wt.intramuscularly on day one. Inj. Imferon (Iron dextran) @ 4ml intramuscularly on day one. Liq. aRBCe RAAKT (haematinic) 50ml BID for the next two weeks. Liq.Liv 52 (liver tonic) 50ml BID for the next two weeks. The animals became afebrile by 12 hours of therapy. The colour of urine became normal only after one day while the milk production was restored to its normal level by two weeks

4. Discussion

The tick-borne infection leads to negative impact on livestock health as well as great economic losses. Babesiosis is an important tick borne protozoan infection caused by genus *Babesia* which is clinically characterized by high fever, in appetite, emaciation, anaemia, jaundice and hemoglobinuria, occasionally diarrhoea and abortion may occur in pregnant cattle (Salem *et al.*, 2016) ^[1] The present study conducted on five clinical cases of cattle, showed clinical symptoms such as high fever, off feed, reduced water intake, hemoglobinuria, anaemia, pale mucous membrane, general weakness, anorexia. All the animals were infested with ticks. In majority of cases animal were passing coffee coloured urine. Deepak *et al.* (2019) ^[5] reported that haemogram of Babesia infected cattle revealed extremely low levels of Hb, PCV, TEC and platelet counts and serum biochemistry revealed severe hyperglycemia, hyperbilirubinemia, moderate elevation of BUN and AST, and hypoproteinemia.

Abundance of intermediate host i.e. *Boophilus sp.* of tick, were observed as predisposing factor in the development of clinical symptoms. Achuthan *et al.* (1980) ^[6] demonstrated the

developmental stages of *Babesiabigemina* in *Boophilusmicroplus* as sporozoites in squash preparations of larva, nymph and adult stained with haematoxylin and eosin.

The light microscopy examination for detection of *Babesia piroplasm* is relatively cheap, quick and gold standard. Bose *et al.* (1995) [7], claimed that the method of choice to detect Babesial parasites in acute conditions was the examination of Giemsa stained thin blood films for excellent demonstration of morphological details of the parasites and species identification were possible.

All the affected animals under study were treated with Diminazine aceturate along with supportive therapy. The animals became afebrile by 12 hours of therapy. De Vos (1979) [8] suggested the most commonly used chemotherapy for *Babesia* infections in cattle is Diminazineaceturate. It has rapid action against *B. bovis* and *B. bigemina* and can protect cattle for 2 to 4 weeks. The present study suggested that early detection as well as specific chemotherapy and intensive supportive therapy are essential for successful management of Babesiosis in cattle.

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