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Clinico- diagnosis and therapeutic management of babesiosis in cattle

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Abstract

A seven-year-old HF cow was brought in with a history of lethargy and depression, loss of appetite, suspended rumination, red urine and decreased milk production. The clinical assessment showed an elevated rectal temperature (103.7 °F), lethargy and apathy, yellowish mucous membranes, and haemoglobinuria. The Cattle was mildly infested with ticks; Haematological examination indicated a reduction in packed cell volume (PCV), haemoglobin (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), and total erythrocyte count (TEC). Microscopic analysis of Giemsa-stained blood smears verified the existence of *Babesia bigemina* piroplasms within the erythrocytes. Cattle was effectively treated with diminazine aceturate at a single dose of 5 mg/kg body weight, deep intramuscularly, accompanied by supportive therapy. The Cattle was afebrile 2 days post-treatment and following four days of treatment, the urine color returned to normal, with appetite and milk production subsequently restored.

Keywords: Babesiosis, *Babesia bigemina*, haemoglobinuria, tick infestation

Introduction

Tick-borne diseases (TBD) are hemoprotozoa infections that have a significant negative economic impact on farming communities and constitute a serious threat to livestock productivity in tropical and subtropical nations. (Sawitri *et al.*, 2022) ^[1] Hemoprotozoan diseases are widely prevalent in Indian livestock. Babesiosis is the second most common hemoprotozoan disease affecting cattle in India. (Shah *et al.*, 2019) ^[3] Babesiosis has been identified as a serious issue with significant economic implications for cows, with an annual financial loss of INR 580.16 crore in India (Narladkar, 2018) ^[4]. It is one of the most significant tick-borne illnesses that affect cattle and buffaloes and is caused by blood parasites belonging to the species *Babesia*. One-host hard ticks, *Rhipicephalus* spp., are the primary arthropod vectors of *B. bigemina* and *B. bovis*. The incubation period typically lasts two to three weeks following tick infestation (Joshi *et al.*, 2020) ^[2]. *Babesia bigemina* is the most common species found in cows in India. Ticks called *Rhipicephalus microplus* and *Rhipicephalus annulatus* are responsible for the disease's natural transmission from affected to healthy animals (Shah *et al.*, 2019) ^[3]. High fever (102.5 to 104.2 degrees Fahrenheit), anorexia, depression, lethargy, jaundice, emaciation, decreased milk production, hemoglobinuria, and anemia in advanced stages of infection are the main symptoms of babesiosis. Reduced Hb, PCV, and TEC, increased AST, hyperglycemia, hyperbilirubinemia, and hypoproteinemia are indicators of hemato-biochemical changes (Rani *et al.*, 2010) ^[2]. Acute infections characterized by fever, anemia (PCV falls below 20%), and hypotensive shock syndrome can result in death within a few days (Joshi *et al.*, 2020; Francisco *et al.*, 2013) ^[2, 6]. The diagnosis of babesiosis is typically made using Giemsa-stained thin blood smears under oil immersion, hemato-biochemical examination, and serological or molecular techniques like PCR and ELISA. (D. Chandran, 2021) ^[7].

History and Clinical Signs

A HF Crossbreed Cattle aged about 7 years with symptoms of dullness and depression, anorexia, suspended rumination, red urine and reduced milk yield was presented in the field. A Cattle was sick since last 4 days. Clinical examination revealed elevated temperature 103.7 °F,

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accelerated heart and respiration rate, Mucous membrane was icteric. Tick infestation was also observed on body coat. About 3 ml of blood was drawn from jugular venipuncture and placed in EDTA vials, and complete blood count was carried out. CBC Packed cell volume (PCV), haemoglobin (Hb), total leucocytic count (TLC), differential leucocytic count (DLC) and the total erythrocytic count (TEC) were significantly decreased in accordance with CBC.

Blood sample collected in EDTA vial was immediately processed for blood smear preparation. The blood smear prepared was fixed using absolute methanol and stained with Giemsa stain (1: 10 ratio) for 25 to 30 minutes. The slide is cleaned with running water, let to air dry, and then examined with a high-powered objective. *Babesia bigemina* piroplasm within the infected erythrocytes was visible under a microscope (100X) of the slide. Based on evidence of haemoglobinuria, Haematological findings and blood smear examination it was diagnosed as Babesiosis.



Fig 1: Icteric conjunctival mucous membrane

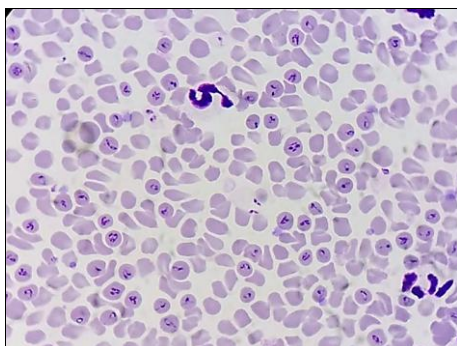


Fig 2: *Babesia bigemina* piroplasm under a microscope (100X)

Treatment and Discussion

Cattle was treated with Inj. Dimenazine acetate @ 5 mg/kg by deep intramuscular route, along with supportive therapy included Inj. meloxicam at the dose of 0.5 mg/kg IM, Inj. chlorpheniramine maleate 0.5 mg/kg IM, Inj. Liver extract 10 ml IM for 4 days and Feritas bolus orally at the dose of 2 bolus daily for 7 days. Injection ivermectine was also given @ 0.2 mg per kg body weight for tick control. After 2 days of treatment animal became afebrile and after 4 days of treatment colour of urine became normal further appetite and milk production was restored.

The fast growth of *Babesia* organisms in peripheral blood vessels, which causes extensive intravascular hemolysis, phagocytosis of both infected and non-infected red blood cells, and bone marrow suppression due to decreased erythropoietic activity, may be the cause of the clinical symptoms, which include hemoglobinuria, anemia, and icterus. All of these could result in decreased Hb, PCV, and

TEC values (Rani *et al.*, 2010, Siddiqui *et al.*, 2018) [2, 8]. The erythrocytic indices (MCV, MCH, and MCHC) showed normocytic and normochromic anemia as a result of the intravascular hemolysis. Anaemic hypoxia resulted from it. The heart and lungs' compensatory mechanism for adequate tissue oxygenation caused an increase in pulse and respiratory rates (Tufani NA *et al.*, 2015) [9].

Conflict of interest

Not available

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Not available

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