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A clinical case report of sub-clinical theileriosis with characteristic Giemsa-stained blood smear and hematological findings

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ABSTRACT

Bovine theileriosis, a tick-borne parasitic disease, causes significant economic losses in cattle farming. This case report documents the clinical manifestations, diagnostic findings, and therapeutic management of theileriosis in a crossbred bovine at 8 months of gestation, which presented with loss of appetite, enlargement of lymph nodes, reduced water intake, no defecation. On physical examination, normal temperature, pale mucous membranes, and cessation of ruminal motility. Giemsa-stained peripheral blood smears revealed characteristic parasitic inclusions within white blood cells and red blood cells, confirming *Theileria* infection. Hematological findings showed hemoglobin (5.2 g/dl), red blood cells (3.6 millions/ μ l), white blood cell count (19,400/ μ l) and the differential leucocyte count shows Neutrophils (18%), Lymphocytes (78%) and Eosinophils (4%).

Keywords: Bovine theileriosis, *Theileria annulata*, Lymph nodes, Lymphocytes, Giemsa staining

Introduction

Bovine theileriosis represents a significant vector-borne parasitic disease caused by apicomplexan protozoa, resulting in considerable morbidity and mortality among affected cattle populations. The economic burden of this disease in India is substantial, with estimated annual losses exceeding 800 million US dollars attributable solely to theileriosis-related impacts (Debbarma *et al.*, 2023) [1]. Livestock production constitutes a vital component of Indian agriculture, contributing approximately 25.6% to the agricultural sector and 4.11% to the nation's overall gross domestic product (Khatoon *et al.*, 2021) [2].

Theileriosis reduces production efficiency and creates substantial financial hardship for farming communities. Globally, acarine parasites and their associated transmissible infections represent a critical constraint to sustainable livestock farming. Among arthropod disease vectors, tick species are second only to mosquitoes in their capacity to transmit pathogens to both animal and human hosts (Khatoon *et al.*, 2021) [2].

Etiology and pathophysiology

The causative agent of tropical bovine theileriosis, *Theileria annulata*, is transmitted to cattle through the bite of two-host ticks, primarily *Hyalomma anatolicum*. The disease presentation varies in severity, manifesting as acute, subacute, or chronic conditions. Disease intensity correlates with the sporozoite burden introduced by the tick vector and is characterized by parasitic invasion of erythrocytes and leukocytes, particularly targeting regional lymph nodes (Kumar *et al.*, 2023) [3].

Clinical manifestations

Affected animals display characteristic clinical signs including loss of appetite, enlargement of lymph nodes, reduced water intake, absence of defecation, and cessation of ruminal motility. In the absence of appropriate therapeutic intervention, the disease may progress to fatal outcomes (Kamel *et al.*, 2024) [4].

Materials and Methods

History

A cross-bred 8 months pregnant cow was brought to the clinic displaying clinical signs of anorexia, reduced water intake, absence of fecal output, and cessation of ruminal activity. Clinical examination pale conjunctival membranes, enlargement of the pre-scapular lymph node, and a rectal temperature of 101.9 °F.

Blood collection

Blood samples were procured aseptically from the peripheral circulation via the ear vein using standard venipuncture with a sterile 20G needle and syringe. Two-millilitre aliquots were deposited into EDTA-anticoagulated collection tubes.

Giemsa staining

A thin blood film was prepared on a glass slide using an ethylenediaminetetraacetic acid (EDTA)-anticoagulated blood specimen. The smear was immediately fixed with methanol for approximately 120 seconds. The fixed blood film was covered with freshly prepared Giemsa stain that had been diluted at a 1:9 ratio with distilled water. The staining procedure was allowed to proceed for 20 to 40 minutes to ensure adequate chromatic penetration. The excess stain was removed by gentle rinsing under running water until the background appeared clear. The smear was examined using light microscopy under a 100x oil immersion objective lens to visualize and identify *Theileria*

parasites located within the cytoplasm of lymphocytic cells and RBCs (Soulsby, 1982) [5].

Haematology

The following haematological parameters were determined from blood specimen: Haemoglobin (5.2 g/dl), Erythrocyte Count (3.6 millions/ μ l), Leucocyte Count (19,400/ μ l), Differential Leukocyte Profile Neutrophils (18%), Lymphocytes (78%), Eosinophils (4%). Tests was performed according to established procedures referenced in (Sastry, 1983) [6].

Results

Giemsa-stained blood films examined under oil immersion microscopy at high magnification revealed Koch's Blue Bodies (KBBs) within lymphocyte cytoplasm which are recognized as macro schizonts of the protozoa (fig. 1 and 2) alongside intra-erythrocytic piroplasmic inclusions (Fig. 3), substantiating *Theileria* infection in the animal.

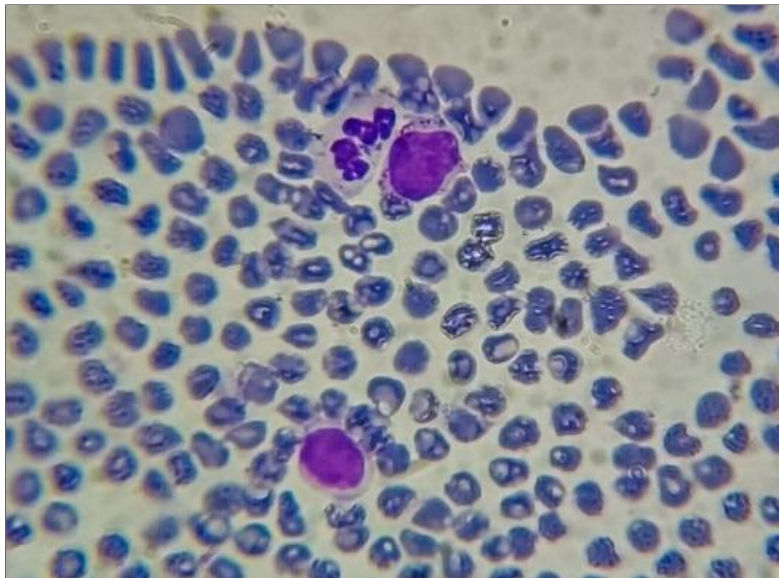


Figure 1. Cytoplasm Lymphocyte with Koch's blue bodies

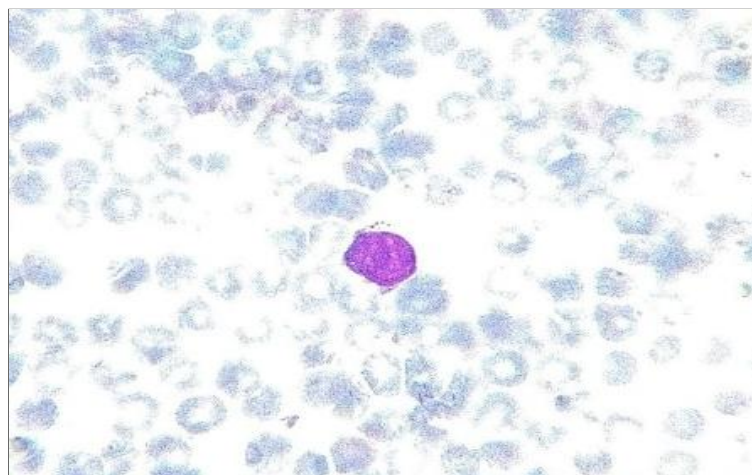


Figure 2. Brightness-enhanced lymphocyte with KBBs

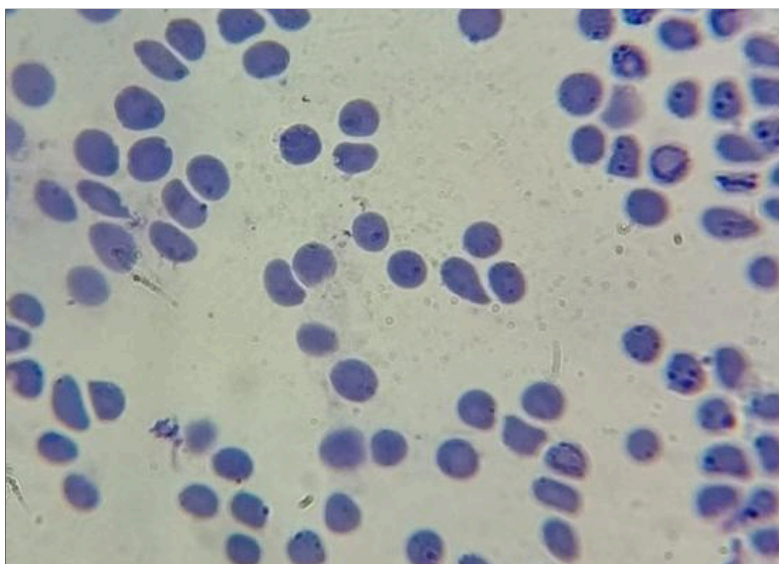


Figure 3. Intra-erythrocytic piroplasmic stage (ring form)

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