

Successful treatment of babesiosis in an Asiatic lion with imidocarb dipropionate and doxycycline

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Abstract

A 5-year-old Asiatic lion had started passing red-coloured urine but had a normal appetite. Clinical examination revealed a rectal temperature of around 102.5°F. For diagnosis, blood smears were made to rule out *Babesia* piroplasm. Additionally, haemato-biochemical and urine analysis was conducted. Microscopy revealed the presence of intra-erythrocytic *Babesia* piroplasm, and a urine sample was positive for haemoglobinuria. A haematological examination revealed normal Hb and PCV levels but with increased TLC count and neutrophils around 96%. Serum BUN, creatinine, SGPT and SGOT levels were also increased compared to normal values. The lion was treated with imidocarb injection with a repeated dose after 2 weeks, followed by oral doxycycline 300 mg for 21 days. After treatment, the animal recovered fully without any relapse.

Keywords: Asiatic lion, Babesiosis, Doxycycline, Imidocarb, Zoo

Highlights

- Clinical and morphological diagnosis of *Babesia* piroplasm infection in an Asiatic lion at Chhatbir Zoo, Chandigarh, Punjab.
- Imidocarb dipropionate and doxycycline were used as a combination therapy in feline babesiosis.
- After treatment, the Asiatic lion recovered fully without any relapse of hemoglobinuria, and the absence of babesia piroplasms.

Babesia, *Hepatozoon*, *Ehrlichia*, and *Mycoplasma* are the most prevalent infections seen in wildlife (Rar and Golovijova, 2011). Although these infections are normally asymptomatic, certain situations, such as unnatural hosts, stress from confinement, habitat destruction, unfavourable climatic conditions, and immunosuppression, can make them pathogenic (Penzhorn, 2006; East *et al.*, 2008). *Babesia* is clinically characterized by fever, haemolytic anaemia, haemoglobinuria, jaundice, and death (Penzhorn, 2006; Haq *et al.*, 2017; Haq *et al.*, 2021; Remesar *et al.*, 2022).

An Asiatic lion named Gagan (in Chaatbir zoo), aged around 5 years and weighing around 200 kg (Fig. 1), had passed red-coloured urine. On investigation by the GADVASU team (Fig. 2), the lion was taking food and water normally, but the rectal temperature was around 102.5°F. Giemsa-stained blood films were prepared, and blood samples were collected for haemato-biochemical examination at GADVASU,



Fig. 1. Asiatic lion suffering from babesiosis

Ludhiana. Haemato-biochemical parameters were evaluated using an autoanalyzer. A urine sample was also taken in a test tube to confirm haemoglobinuria after centrifugation.

Blood film examination revealed the presence of intra-erythrocytic piroplasms of *Babesia* (Fig. 3) which

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Fig. 2. GADVASU team for examination of the Asiatic lion (Gagan)

is in accordance with the findings of (Kinge *et al.*, 2010). Large (2x5 micron), pear-shaped organisms that are typically seen in pairs along with several other shapes can be detected on microscopy in babesia infected animals (Haq *et al.*, 2017; Haq *et al.*, 2021). Urine sample was also positive for haemoglobinuria on centrifugation.

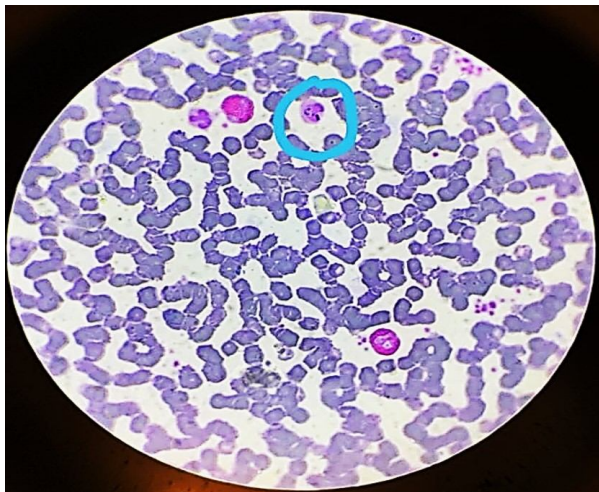


Fig. 3. Intraerythrocytic *Babesia felis* piroplasm

Haematological examination revealed normal Hb (16.0 g/dL) and PCV (42.7 %), but with an increased TLC (14,600/ μ L) count. Increased pre-treatment TLC count in the present case could be attributed to stress induced by the *Babesia* infection (Ahmad *et al.*, 2023). DLC values revealed increased neutrophils (96%) and lymphocytes (04%). Serum BUN (38 mg/dL), creatinine (5.9 mg/dL), SGOT (98 IU/L) and SGPT (90 IU/L) levels were also increased compared to normal values (Jani and Sabapara, 2010). Clinical signs and laboratory parameters were monitored throughout the study.

After confirmation of the babesiosis through microscopy, the Asiatic lion was treated with injection imidocarb (Babimido, Zydus AHL) 8.3 mL intramuscular

(@ 5 mg/kg body weight) and repeated after 2 weeks. Dr. Doxy (Doxycycline) 300 mg @ 5 mg/kg body weight (TTK Pharma) was also given (4 tabs per os twice daily) in meat for a period of 21 days. For supportive therapy, Syp. Livotas pet (Intas) 50 mL per os in water was offered for 2 weeks.

Haematological examination after treatment revealed Hb levels of 16.6 g/dL, PCV 51.3%, and a decrease in TLC count (13,000/ μ L). DLC values revealed a decrease in neutrophils (78.6%), normal lymphocytes (19%), and eosinophils (3%). Post-treatment value of serum BUN was normal (30 mg/dL), serum creatinine was slightly decreased (4.1 mg/dL), and SGOT was decreased to 84 IU/L. SGPT showed no significant change. Elevated levels of BUN and creatinine in *Babesia* infection are due to the degraded byproducts of damaged erythrocytes that are deposited in the kidneys, which reduces the excretion of both BUN and creatinine (Kinge *et al.*, 2010; Ahmad *et al.*, 2023). An increase in SGOT level in babesiosis occurs due to massive haemolysis in conjunction with hypoxia, and a similar increase of AST in *Babesia* was reported by Ahmad *et al.* (2023). After treatment, the animal recovered fully without any relapse of hemoglobinuria and the absence of *Babesia* piroplasms on microscopy. Hence, use of Imidocarb and doxycycline in an Asiatic lion is safe and with good efficacy for the treatment of babesiosis. There was no evidence of significant toxicity associated with this combination treatment protocol.

Feline babesiosis in lions is caused by *Babesia* organism, and is characterized by a persistent, low-grade fever. Anorexia and lethargy are the two most commonly expressed complaints. Anaemia, depression, and occasional icterus are seen as the predominant clinical symptoms (Kumar *et al.*, 2008). Numerous felines exhibit different electrolyte problems, but no co-changing pattern could be found. The summer months have the highest occurrence of babesiosis. The most frequent haematological finding is macrocytic hypochromic anaemia, but white blood cell and thrombocyte counts might vary and fluctuate. The elevated ALT and bilirubin activity are the most notable biochemical findings (Kumar *et al.*, 2008). Serology and PCR testing may be more reliable diagnostic tools. For the therapy of babesiosis, imidocarb is the primary drug of choice, along with doxycycline, which has a synergistic effect (Kumar *et al.*, 2008; Kundu *et al.*, 2013). Supportive care ought to be based on a complete patient evaluation, monitoring, and the right lab tests.

Conflict of interest: Authors have no conflict of interest in this clinical study.

Author's contribution: AKS: Diagnosis of the disease, sample collection and participation in analysis, draft and revision of the manuscript; AK: Carried out the diagnosis; AUH: Participated in diagnosis, draft and revision of the manuscript; RR: Participated in revision of the manuscript.

Data availability statement: All the data supporting

the research findings have been presented in this paper. The corresponding author is willing to provide the raw data upon reasonable request.

ACKNOWLEDGEMENT

We sincerely thank the authorities of Chhatbir Zoo, Punjab, for providing complete support in conducting this clinical study.

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