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Babesiosis in equines in Pakistan: a clinical report

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Summary

Equine babesiosis is a tick-borne haematological disease of equidae that can affect acutely, subacutely and chronically. The disease is manifested by intermittent fever, anaemia, icterus and haemoglobinuria. The authors describe the clinical, haematological and therapeutic aspects of babesiosis in equines at two units in Kotley and at two units in Jehlum of the Remount Veterinary and Farms Corps (RVFC). Animals on these units showed the signs of illness. On clinical examination, intermittent temperature, increased respiratory rate, anaemia, lacrimation, conjunctivitis and pale mucous membranes were observed. Haematological examination revealed a decrease in red blood cell count and haemoglobin concentration, accompanied by an increase in total white blood cell count. Cases of babesiosis in horses were successfully treated with imidocarb dipropionate at a dose rate of 4 mg/kg body weight, administered intramuscularly four times at 72 h intervals, together with supportive therapy.

Keywords

Babesia, Babesiosis, Equine, Haematological examination, Horse, Imidocarb dipropionate, Pakistan, Red blood cell, White blood cell.

Babesiosi equina in Pakistan: descrizione di casi clinici

Riassunto

La babesiosi equina è una malattia ematologica degli Equidi trasmessa da zecche. Può presentarsi in forma acuta, subacuta e cronica. La malattia si manifesta con febbre intermittente, anemia, ittero ed emoglobinuria. Gli autori descrivono gli aspetti clinici, ematologici e terapeutici della babesiosi in equini di due unità a Kotley e due unità al Jehlum, Remount Veterinary and Farms Corps *(RVFC). Negli animali sono risultati presenti i sintomi della malattia. L'esame clinico ha evidenziato febbre intermittente, respirazione accelerata, anemia, lacrimazione, congiuntivite e pallore delle mucose. L'esame ematologico ha rilevato una riduzione della conta eritrocitaria e della concentrazione di emoglobina, oltre a un aumento della conta totale dei leucociti. I casi di babesiosi nei cavalli sono stati trattati con successo con imidocarb dipropionato somministrato per via IM alla dose di 4 mg/kg di peso corporeo per quattro volte al giorno, a intervalli di 72 ore e terapia di supporto.*

Parole chiave

Babesia, Babesiosi, Cavallo, Equino, Eritrociti, Esame ematologico, Imidocarb dipropionato, Leucociti, Pakistan.

Introduction

Tick-borne diseases are one of the major constraints for livestock production in Pakistan. Equine babesiosis is a tick-borne haematological disease of equidae that can affect acutely, subacutely and chronically, resulting in intermittent fever, anaemia, icterus and haemoglobinuria.

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This condition is caused by *Babesia caballi* and *Babesia equi* which can parasitise erythrocytes (3, 15). Both parasites can cause morbidity and, in some cases, mortality and are therefore of considerable veterinary economic importance particularly to the horse-racing industry. *B. equi* is one of the small species that appear as an oval, circle, amoeboid or as double pears while *B. caballi* is the larger species that appears amoeboid, oval, circular and mainly in single or double pears (13).

During babesiosis infection, erythrocytes and haemoglobin loss may exceed 50% (and can be increase up to 90%). Activity of the haemato-poietic organs is disrupted, causing poikilo-cytes and macroerythrocytes (16). In one report, there was a rapid decrease of packed cell volume (PCV) from a normal level of 35% to below 10% in less than a week after the onset of clinical signs of babesiosis (14). Equines die within 24 h to 48 h after the development of first clinical signs. In chronic cases, the disease may continue for months and the condition of these animals deteriorates within 3 to 4 years (12).

There are a number of effective babesicides available, including quinuronium sulphate, pentamidine, amicarbalide, diminazene aceturate and imidocarb dipropionate (21). Among these, imidocarb dipropionate is effective in eliminating the carrier state of infected animals (20).

This report describes the clinical, haematological and therapeutic aspects observed in equines with babesiosis at the Remount Veterinary and Farms Corps (RVFC) units in Jehlum and Kotley.

Materials and methods

The site and animals

Cases were reported in August 2007 in four different units of the RVFC. Two units were located in Jehlum, while the other two were located in Kotley. All four units consisted of stud farms of horses and mules. In Kotley, animals ($n = 15$) showed signs of illness and, at that time some animals were shifted from the Kotley units of RVFC to Jehlum. After a few days, some animals ($n = 6$) in Jehlum also exhibited the same signs of illness. Animals generally showed signs of inappetence and weight loss. On clinical examination, an intermittent temperature (40°C-41°C) was observed, together with increased respiratory rate, anaemia, conjunctivitis, emaciation, pale mucous membranes and dark yellow urine in some animals. The official of the respective units observed recovery in affected animals when treated symptomatically. Later, the animals showed the same signs of illness (relapse). At this point, a team was despatched from the Veterinary Research Institute in Lahore to investigate the problem.

Examination of blood smears

Animals ($n = 21$) showing signs of illness were tested for the presence of haemoparasites through blood smears (5). For this purpose, blood smears were prepared from the marginal ear vein, then were air-dried, fixed in methanol and stained in 10% Giemsa solution in phosphate buffered saline (PBS) (2). The slides were examined and microscopic examination revealed the presence of the *Babesia* organism in red blood cells (RBCs) (Fig. 1).

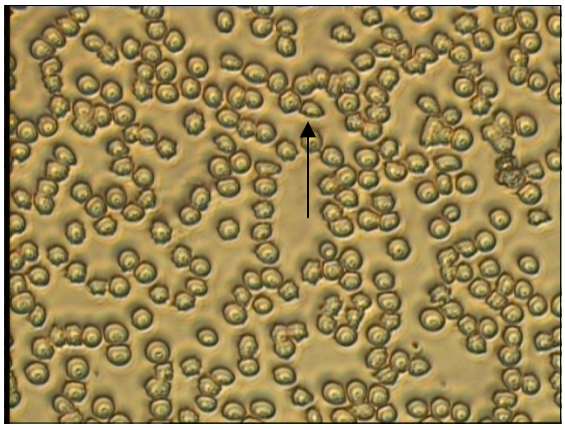

Figure 1
Blood smear showing abnormalities in erythrocytes with *Babesia* parasites

Haematological and therapeutic study

After confirmation of the presence of *Babesia*, haematological tests, including haemoglobin concentration and total white and red blood cell counts, were performed on infected and recovered animals (2). A volume of 10 ml

blood, collected from the jugular vein in heparinised vacutainer tubes from ten *Babesia*-positive animals and recovered animals ($n = 9$), was used to conduct the above haematological tests. Simultaneously, treatment was initiated in clinically positive animals with imidocarb dipropionate at a dose of 4 mg/kg body weight, administered intramuscularly four times at 72 h intervals, along with the supportive therapy i.e. anti-inflammatory therapy and the administration of vitamin B.

Results and discussion

Clinical signs and symptoms

Babesiosis is a febrile, tick-borne disease of equids that is present throughout the tropics and subtropics and, to a lesser extent, in temperate regions. Our report presents the clinico-haematological and therapeutic aspects in equines that were discovered with babesiosis at RVFC units.

Reported clinical signs and symptoms were recurrent fever (40°C-41°C), increased respiratory rate, anaemia, conjunctivitis, lacrimation, dullness, pale mucous membrane and dark yellow urine. These observations concurred with reports by Hailat *et al.* (11), Freidhoff (8), Bruning *et al.* (4), Schein (19) and De Waal (7), who described the *Babesia* organism in equines in relation to the history of fever, anaemia, jaundice, anorexia and weakness.

In the present study, *Babesia* organisms were observed as pear-shaped bodies within RBCs in blood smears. This observation was in agreement with Guimaraes *et al.* (10) who reported *Babesia* within RBCs. The same authors also reported antibody titres against *B. equi* using the immunofluorescence antibody test (IFAT).

Haematological and therapeutic study

Haematological aspects were studied in an attempt to provide information on the disease status. Certain blood parameters were studied in infected animals and compared the severity of disease with recovered animals. For this purpose, the mean total red and white blood cell counts, along with haemoglobin concentrations, were calculated and we observed that there was a slight decrease in red blood cell counts and haemoglobin concentration in infected animals. However, during the course of the disease, there was a slight increase in the total white blood cell count (Fig. 2), while the recovered animals showed a normal range of haematological values (Fig. 3).

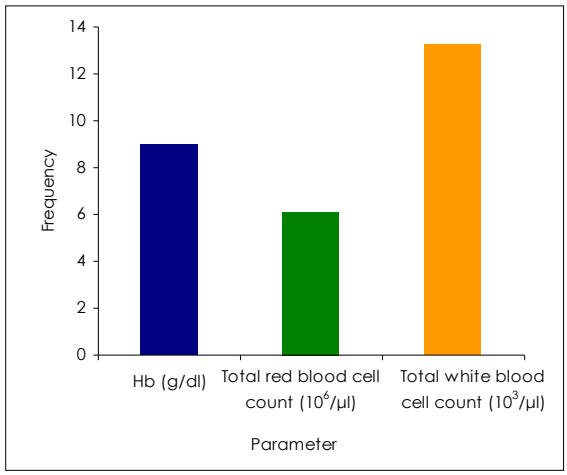

Figure 2
Effect of babesiosis on average blood parameters of affected horses ($n = 10$)

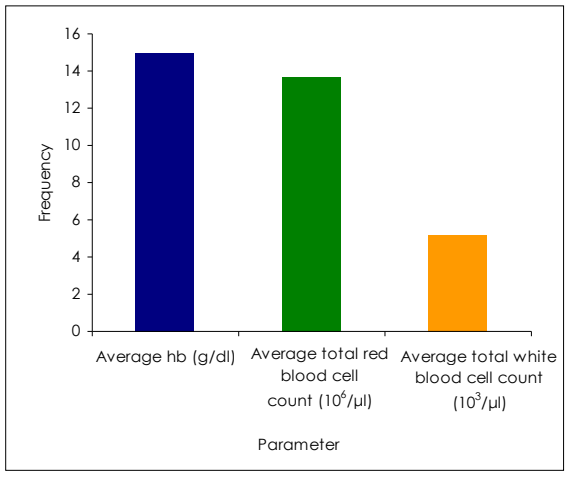

Figure 3
Blood parameters in recovered horses ($n = 9$)

The results of our study concur with the data presented by Rubino *et al.* (18) who studied the haematological and other blood chemical parameters in equines and concluded that there was a decrease in red blood counts and haemoglobin concentrations and a mild

increase in white blood cell counts in horses with tick-borne disease. The results of our study were also in agreement with the results of Gautan and Chaudhary (9) and Nogueira *et al*. (17) who reported that there was a decrease in haemoglobin content during the course of babesiosis. The reduction in RBC counts occurred due to anaemia as well as due to the destruction of RBCs by *Babesia*.

Imidocarb appears to be the drug of choice for eliminating the carrier status of infected horses (20). In our study, animals showing the signs of illness were treated with imidocarb dipropionate at a dose rate of 4 mg/kg body weight, administered intramuscularly four times at 72 h intervals, together with supportive therapy. The animals showed apparent recovery by chemotherapy and all animals recovered after the end of course of medication.

Our findings indicated that imidocarb at a dose rate of 4 mg/kg body weight is the most effective drug to eliminate *Babesia* in the host. Correa *et al*. (6) evaluated the efficacy of imidocarb dipropionate as a therapeutical agent in 15 horses; 66.7% of animals were found to be negative to both species after 40 days and 86.7% were negative for *B. caballi*. Similar results were found by Vial and Gorenflot (22) and by Al-Saad and Al-Mola (1) when treating horses with imidocarb.

Conclusion

In conclusion, clinical signs and symptoms, together with microscopic examination of *Babesia* organisms in RBCs confirmed the presence of cases of equine babesiosis. However, it was difficult to differentiate the species of *Babesia*. Consequently, there is a need for serological and molecular tests to study the prevalence of species of *Babesia* in these areas. The cases of babesiosis in horses were successfully treated with imidocarb dipropionate at a dose of 4 mg/kg body weight, administered 4 times intramuscularly at 72 h intervals, together with supportive therapy.

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