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Haematobiochemical alterations in canine babesiosis

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Abstract

Canine babesiosis is an important tick-borne haemoprotezoan disease of dogs caused by intraerythrocytic parasites of the genus *Babesia*. The disease is characterized by anaemia, thrombocytopenia and biochemical alterations reflecting hepatic, renal dysfunction and systemic inflammatory reaction. The present study investigated haematological and biochemical changes in 24 polymerase chain reaction (PCR)-positive dogs naturally infected with *Babesia* spp., and compared them with apparently healthy controls. Haematological findings revealed significant decreases in haemoglobin, packed cell volume (PCV) and erythrocyte counts, while leukocytosis was the most common leukocyte alteration in cases of canine babesiosis. Thrombocytopenia was observed in 75% of cases. Biochemical evaluation revealed elevated serum ALT, ALP, creatinine, BUN, globulin and bilirubin levels, while albumin was significantly decreased. These results confirm that canine babesiosis causes considerable alterations in both haematological and biochemical parameters, indicating the pathophysiological effects of intravascular haemolysis, immune-mediated injury, hepatic and renal dysfunction.

Keywords: Canine babesiosis, haematology, biochemical alterations, anaemia, thrombocytopenia

Introduction

Canine babesiosis is a globally distributed tick-borne haemoprotezoan disease of dogs caused by parasites of the genus *Babesia*. The infection is transmitted mainly by *Rhipicephalus sanguineus* and ixodid ticks, although transmission may also occur via blood transfusion, bite wounds or transplacental routes. Among the *Babesia* species infecting dogs, *Babesia canis vogeli* and *Babesia gibsoni* are most prevalent in India, differing in morphology, epidemiology and pathogenicity (Malinová, 2024) [6]. The pathogenesis of babesiosis involves both direct destruction of erythrocytes by intraerythrocytic replication and indirect immune-mediated haemolysis, leading to regenerative anaemia and thrombocytopenia. Secondary hepatic and renal dysfunctions are also common (Norbury *et al.*, 2023) [8]. Clinical signs vary depending on the infecting species and disease stage but typically include fever, lethargy, pallor, icterus, haemoglobinuria and splenomegaly. Alterations in haematological and biochemical parameters are critical diagnostic and prognostic indicators in canine babesiosis. Haematological changes primarily include anaemia, leucocytic alterations and thrombocytopenia. Whereas, biochemical changes may involve hepatic and renal parameters such as ALT, ALP, bilirubin, BUN, creatinine and proteins (Stegman, 2019) [11]. The present study aimed to document haematobiochemical alterations in naturally infected dogs confirmed by PCR.

Materials and Methods

Serum samples from 24 PCR-positive dogs for babesiosis and 10 PCR-negative apparently healthy dogs were used for biochemical analysis. The parameters estimated included blood urea nitrogen (BUN), creatinine, albumin, globulin, total protein, alanine aminotransferase (ALT), alkaline phosphatase (ALP), and total bilirubin using a fully automated biochemistry analyser with diagnostic reagent kits.

Results

The haematological analysis of babesiosis-affected dogs revealed marked alterations when compared to healthy controls. The mean total leukocyte count (TLC) was significantly higher

($27.98 \pm 3.37 \times 10^3/\mu\text{L}$) than in controls ($11.50 \pm 3.20 \times 10^3/\mu\text{L}$), with leukocytosis recorded in 54.17% of cases, leukopenia in 16.67% and normal counts in 29.17%. Erythrocyte parameters showed a pronounced decline, with haemoglobin ($7.19 \pm 0.51 \text{ g/dL}$), red blood cell count ($3.00 \pm 0.22 \times 10^6/\mu\text{L}$) and packed cell volume ($20.08 \pm 1.12\%$) markedly reduced, indicating that anaemia was present in almost all infected dogs. Platelet counts were also severely affected with a significantly reduced mean value ($92.25 \pm 11.15 \times 10^3/\mu\text{L}$) compared to controls ($275.00 \pm 85.00 \times 10^3/\mu\text{L}$), and thrombocytopenia was observed in 75% of cases.

Biochemical alterations further highlighted systemic involvement. Mean creatinine levels were mildly elevated ($1.60 \pm 0.15 \text{ mg/dL}$), with 20.83% of dogs showing values above normal. Liver enzymes were markedly raised, with ALT ($80.69 \pm 13.45 \text{ IU/L}$) and ALP ($266.51 \pm 60.42 \text{ IU/L}$) significantly higher than controls ($35.00 \pm 15.00 \text{ IU/L}$ and $85.00 \pm 35.00 \text{ IU/L}$, respectively). The mean total protein ($5.73 \pm 1.21 \text{ g/dL}$) remained within the normal range, but hypoalbuminaemia was evident, with mean albumin ($2.17 \pm 0.47 \text{ g/dL}$) significantly lower than controls ($3.25 \pm 0.75 \text{ g/dL}$). In contrast, globulin levels were slightly elevated ($3.85 \pm 1.04 \text{ g/dL}$) compared to controls ($2.75 \pm 0.75 \text{ g/dL}$). Indicators of renal involvement showed significant elevation, with BUN levels ($28.16 \pm 8.50 \text{ mg/dL}$) higher than controls ($17.00 \pm 10.00 \text{ mg/dL}$). Total bilirubin was also significantly raised ($0.66 \pm 0.18 \text{ mg/dL}$) compared to healthy dogs ($0.35 \pm 0.25 \text{ mg/dL}$), confirming haemolysis and hepatic dysfunction.

Discussion

The present study revealed significant haematobiochemical alterations in dogs naturally infected with *Babesia* spp. The marked anaemia observed in all infected dogs is consistent with reports by Sathish *et al.* (2023) [10] and Gollapalli *et al.* (2024) [4] and is attributed to intravascular haemolysis, immune-mediated erythrocyte destruction and bone marrow suppression.

Leucocytic alterations varied, with leukocytosis being the most common, reflecting systemic inflammation and immune response, similar to findings of Kumar and Kumar (2018) [5] and Mittal *et al.* (2019) [7]. However, leukopenia in a subset of cases indicates immunosuppressive effects of *Babesia* as also reported by Lavanya *et al.* (2022).

Thrombocytopenia, observed in 75%age of cases, is a consistent feature of canine babesiosis, corroborating earlier studies (Reddy *et al.*, 2014; Brahma *et al.*, 2019) [9, 2]. It is likely due to immune-mediated platelet destruction, splenic sequestration, and bone marrow suppression.

Biochemical changes indicated multi-organ involvement. Elevated ALT and ALP reflect hepatocellular injury and cholestasis, consistent with previous reports. Hypoalbuminaemia and hyperglobulinaemia suggest impaired liver function and chronic antigenic stimulation respectively. Renal involvement was evidenced by elevated creatinine and BUN, in agreement with Brahma *et al.* (2019) [2]. Increased bilirubin confirms haemolysis and hepatic dysfunction, aligning with findings of Gollapalli *et al.* (2024) [4]. These findings highlight the complex pathophysiology of canine babesiosis, involving haematological destruction, immune dysregulation and multi-organ impairment.

Conclusion

Canine babesiosis induces profound haematological and biochemical alterations, including anaemia,

thrombocytopenia, leucocytic changes, hepatic enzyme elevations, renal dysfunction and protein imbalances. These findings underscore the importance of comprehensive laboratory evaluation in suspected cases to support early diagnosis, assess disease severity and guide therapeutic interventions.

Conflict of Interest: Not available

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References

1. Birkenheuer AJ, Levy MG, Savary KC, Gager RB, Breitschwerdt EB. Development and evaluation of a PCR assay for detection and differentiation of *Babesia gibsoni* (Asian genotype) and *Babesia canis* DNA in canine blood samples. J Clin Microbiol. 2003;41:4172-4177.
2. Brahma C, Sinha KK, Sinha AK, Kumar A, Kumar S. Haematobiochemical alterations in naturally occurring canine babesiosis. J Entomol Zool Stud. 2019;7(2):1225-1229.
3. Földvári G, Hell E, Farkas R. *Babesia canis* and its expanding distribution in Europe. Parasite Vectors. 2016;9:118.
4. Gollapalli S, Reddy BS, Reddy KS, Reddy YR, Reddy PK. Clinical and laboratory findings in dogs naturally infected with *Babesia gibsoni*. Vet Parasitol Reg Stud Rep. 2024;38:100887.
5. Kumar A, Kumar V. Clinico-haematological and biochemical studies on canine babesiosis. Int J Curr Microbiol Appl Sci. 2018;7:1215-1220.
6. Malinová J. Comparative aspects of *Babesia* species infecting dogs. Vet Med (Praha). 2024;69:45-55.
7. Mittal P, Singh H, Singh R, Singh A, Singh S. Clinico-haemato-biochemical changes in canine babesiosis. J Anim Res. 2019;9(2):303-308.
8. Norbury G, Smith J, Brown T, Wilson R. Advances in understanding tick-borne haemoprotozoan infections in dogs. Front Vet Sci. 2023;10:112345.
9. Reddy BS, Reddy KS, Reddy YR, Reddy PK. Haematological and biochemical changes in canine babesiosis. Int J Vet Sci. 2014;3(2):91-95.
10. Sathish R, Kumar P, Ramesh S, Anandan R. Haematological and biochemical changes in canine babesiosis. Indian Vet J. 2023;100(6):35-39.
11. Stegman MR. *Babesia gibsoni*: emerging pathogen in dogs. Comp Immunol Microbiol Infect Dis. 2019;64:101345.
12. Vial H, Gorenflot A, Dinand J, Cuisenier B. Treatment of canine babesiosis with imidocarb dipropionate. Vet Parasitol. 2006;138:9-16.
13. Yadav A, Sharma R, Singh P, Gupta N. Updates on therapeutic strategies for canine babesiosis. Vet Parasitol Reg Stud Rep. 2021;25:100567.

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