



## RESEARCH ON THE PATHOPHYSIOLOGY OF BLOOD IN DOGS WITH BABESIOSIS

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**Abstract:** Knowledge of the normal hematological parameters values and the significance of their changes is essential in order to understand the pathophysiology of babesiosis. The investigations were carried out on fifteen dogs, males and females, with ages between 2 and 7 years. Our study revealed leukopenia, especially at the onset of the disease, then, we identified leukocytosis, We also observed erythropenia and a marked decrease in hemoglobin and hematocrit throughout the course of the disease. Severe thrombocytopenia was noticed throughout the course of the disease, being present in all of the studied cases.

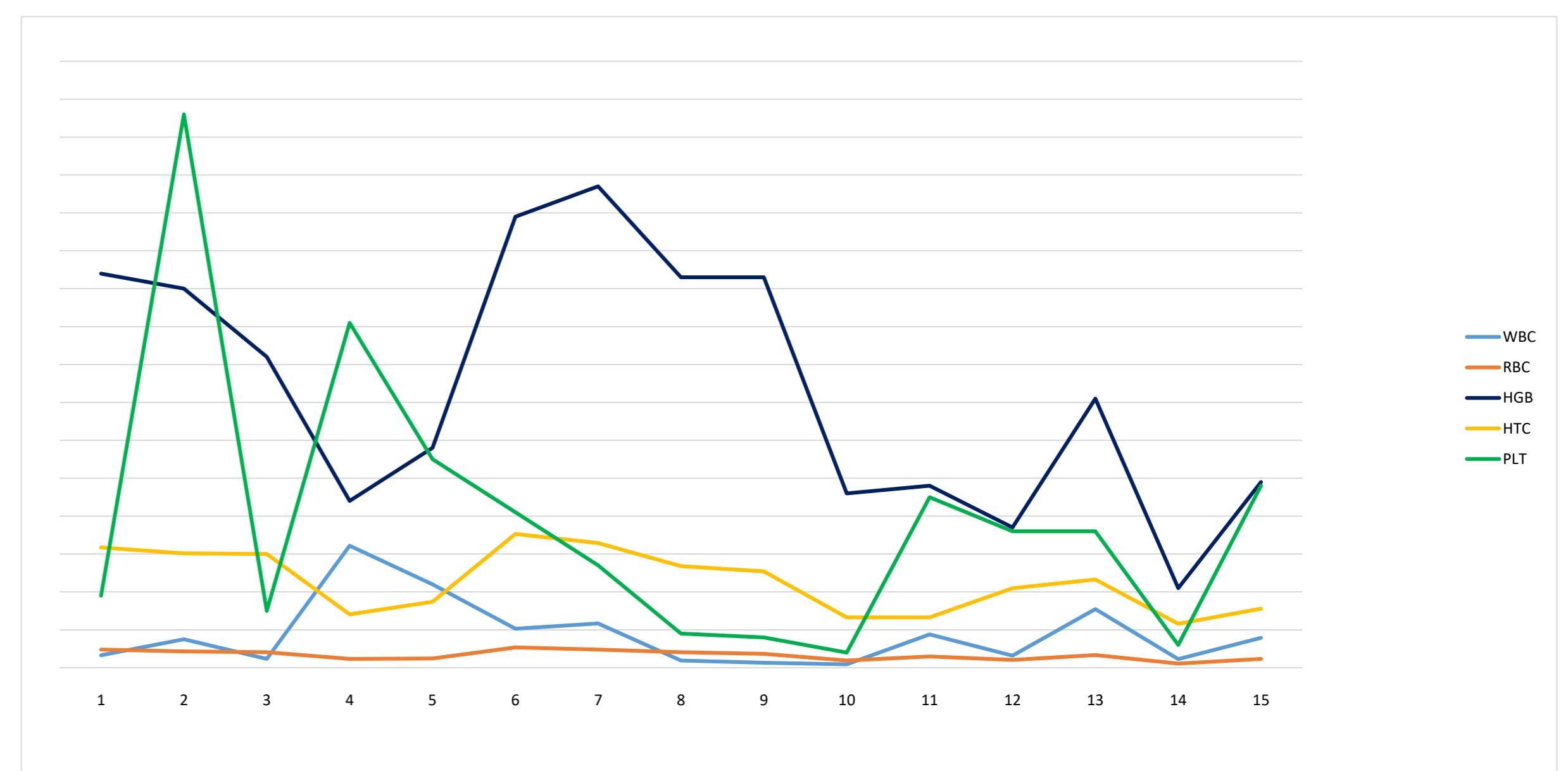
### • Introduction

Canine babesiosis is a vector-borne parasitic disease and currently represents one of the most severe parasitic pathologies in the small animals clinic. We chose as object of study, the changes in hematological parameters in babesiosis, as this disease is very common in our country, while presenting a vast symptomatology. Knowing the values of normal parameters or the significance of their changes is essential in order to compensate for the body's functional deficits. Established hemolytic anemia, as well as the systemic inflammatory response, lead to the appearance of multiple organ failure. Intense hemolysis determines the appearance of hemoglobinemia, bilirubinemia, hemoglobinuria and bilirubinuria. The pathogenesis of babesiosis is represented by the profound alteration of the blood physiology. Once inoculated into the bloodstream, the parasites invade the erythrocytes, initiating a complex multiplication process that leads to intravascular and extravascular hemolysis. Research has demonstrated that the severity of the disease is dictated by a disproportionate immune response, in which the massive release of proinflammatory cytokines generates secondary tissue damages. The most severe impact of Babesia infection is manifested on the components of the red blood cells. The destruction of erythrocytes, achieved both by direct mechanism (parasite multiplication) and by secondary immune mechanisms, leads to a drastic decrease in the parameters of the red blood cells. Thus, monitoring the number of red blood cells, hemoglobin and hematocrit provides essential data on the degree of anemia and the severity of the established tissue hypoxia. The dynamics of the leukocyte population reflects the systemic inflammatory response of the body. Thrombocytopenia is also established, which plays a critical role in the pathogenesis of the disease.

### • Material and method

The research is based on the study of changes in hematological parameters of 15 dogs with babesiosis. The hematological parameters studied were: leukocytes count (WBC), red blood cells count (RBC), hemoglobin (HGB), hematocrit (HTC) and platelets count (PLT). The patients were between 2 and 7 years old, both females and males. Blood was taken from superficial veins (brachycephalic, saphenous or jugular), after a prior haircut and skin asepsis. For the hematological examination, blood was collected using a 2 ml syringe. The hematological examination was performed using an IDEXX analyzer.

### • Results and discussions



Analyzing the figure we can compare the values of the hematological parameters in the 15 studied dogs. Thus, regarding leukocytes, leukopenia is observed in most patients, except for cases 4, 5 and 13, where leukocytosis is present due to the advanced evolution of the disease or inflammatory complications. It can also be observed that in all of the cases, the number of erythrocytes is lower or close to the minimum physiological limit (case 6), depending on the stage of the disease and the body's reaction. Regarding hemoglobin, we can see that the lowest values were recorded in cases 4, 5, 10, 11, 12 and 14, representing a marked anemia, while the rest of the cases presented a mild or moderate anemia, or even had this parameter within the minimum physiological limits. Closely related to the evolution of hemoglobin is the hematocrit, the same major changes being observed in cases 4, 5, 10, 11, 12 and 14, confirming anemia. In the case of platelets, the evolution of their number is oscillating in the 15 studied dogs, but regardless of the patient, we did not find normal or close to the minimum physiological limit values. In all patients, intense thrombocytopenia is observed, especially in cases 1, 3, 8, 9, 10 and 14. The cases moderately affected by the decrease in this parameter are 2 and 4. Thrombocytopenia is constantly in all studied dogs.

### • Conclusions

We found leukopenia especially at the onset of the disease, while later we identified leukocytosis in the more advanced stages of evolution. Regarding the red blood cells, we observed erythropenia and a marked decrease in hemoglobin and hematocrit, throughout the course of the disease. We found severe thrombocytopenia throughout the course of the disease in all studied dogs.