

Case Study

<https://doi.org/10.20546/ijcmas.2020.905.235>

## Successful Therapeutic Management of Babesiosis in a Labrador Dog along with Blood Transfusion

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### ABSTRACT

#### Keywords

Babesiosis, Anemia, Icterus, Imidocarb, Blood transfusion, Labrador

#### Article Info

Accepted:  
15 April 2020  
Available Online:  
10 May 2020

A two and a half year old male Labrador dog was brought with history of inappetence, pyrexia, weakness, vomiting, blood in urine and lateral recumbency since a week. Clinical examination revealed icteric visible mucous membrane, dehydration, high fever (105°F), increased respiratory rate and enlarged superficial lymph nodes with presence of ticks on body surface. Urinalysis revealed haemoglobinuria. Haematological findings revealed severe anemia (Hb- 2.2 g/dl) and thrombocytopenia ( $88 \times 10^5/\mu\text{l}$ ). Serum biochemistry showed elevated BUN (102 mg/dl), creatinine (3.2 mg/dl), ALT (160 U/L) and total bilirubin (2.8 mg/dl). Microscopic examination revealed *Babesia gibsoni* in RBC's. On the basis of history, clinical findings and laboratory examination the case was diagnosed as Babesiosis. The dog was treated with Imidocarb dipropionate, supportive therapy and life-saving blood transfusion.

### Introduction

The occurrence of canine babesiosis on an increase and several cases are being reported from all over India. It is the diseased state caused by protozoal parasites of the genus *Babesia*. The most common mode of transmission in dogs is tick bite. *Babesia piroplasms* infect and multiply in RBCs, resulting in both direct and immune mediated

hemolytic anemia. Other common signs include high fever, pale mucous membranes, jaundice, lack of energy, vomiting, constipation, enlarged abdomen and discolored stool.

Blood transfusions in veterinary medicine have become increasingly more common and are an integral part of lifesaving and advanced treatment of the critically ill animals.

Common situations involving transfusions are life-threatening anemia from acute hemorrhage or surgical blood loss, hemolysis from drugs or toxins, immune-mediated diseases, haemoprotzoal diseases, severe non-regenerative conditions and neonatal isoerythrolysis. It is indicated in situation where packed cell volume (PCV) is less than 15% and haemoglobin concentration below 5 gm% (Tufani *et al.*, 2004).

Whole blood is indicated in patients that requires several blood components or has acutely lost more than 50 % of its total blood volume, in order to replace both oxygen-carrying capacity and oncotic activity (Lanevski and Wardrop, 2001). The present paper reports successful therapeutic management with fresh whole blood transfusion in life threatening acute anemia induced by Babesiosis in a Labrador dog.

### **History, laboratory investigation and diagnosis**

A two and a half year old male Labrador dog (25 kg b.wt.) was presented with history of inappetence, pyrexia, weakness, vomiting, blood in urine and lateral recumbency (Fig. 1) since a week. The animal was repeatedly treated by local veterinarians without success. The dog was vaccinated and dewormed regularly. Clinical examination revealed icteric visible mucous-membrane (Fig. 2), dehydration, high rise of temperature (105° F), increased respiratory rate and enlarged superficial lymph nodes with presence of ticks on body surface. Aseptically, urine was collected by catheter and the sample was immediately transferred into sterilized tubes for investigation.

Urinalysis (centrifugation) of sample taken was found haemoglobinuria (Fig.3) Blood samples were checked for routine hematological and biochemical profiles.

Haematological findings revealed severe anemia (Hb- 2.2 g/dl, PCV- 10 %, TEC- 10.2 ×10<sup>6</sup>/μl, TLC- 7.2 ×10<sup>3</sup>/μl, N- 62/μl, L-34/μl, E- 4/μl) along with thrombocytopenia (PLT- 88 ×10<sup>5</sup>/μl). Serum biochemistry showed elevated blood urea nitrogen (BUN) (102 mg/dl), creatinine (3.2 mg/dl), alanine aminotransferase (ALT) (160 U/L) and total bilirubin (2.8 mg/dl). Peripheral blood smear made from ear tip, stained with Giemsa stain examined under oil immersion (x100) revealed *Babesia gibsoni* in RBC's (Fig. 4). Based on tick history, clinical findings and microscopic examination, the case was diagnosed as canine Babesiosis.

### **Treatment and Discussion**

The treatment was initiated with Inj. Dextrose (20%) @2ml/kg IV OD for 5 days, Inj. Imidocarb dipropionate (Babimido) @6mg/kg SC once, Inj. Vitamin B-complex @3ml IM OD for 5 days, Tab. Pantoprazole @1mg/kg PO OD for 7 days, Tab. Prednisolone (Wysolone) @1mg/kg PO OD for five days along with liver tonic (Hepamust) @2 tsf.PO BID for 7 days.

Since clinical signs and hematological parameters suggested anemia, immediate whole blood transfusion was done on the 1<sup>st</sup> day as emergency treatment. For blood transfusion a three years old healthy Labrador dog (30 kg b.wt.) of same owner was selected as donor and detailed hematological indices were estimated and blood smear examination for hemaprotzoa was also carried out. Major and minor cross matching of donor and recipient was done according to the method of Lanevski and Wardrop (2001). The volume of required blood was calculated on the basis of formula given by Sackmen (1998).

Blood volume to be infused =

$$\frac{\text{Body wt. (kg)} \times 90 \times (\text{Required PCV} - \text{Recipient's PCV})}{(\text{Donor's PCV})}$$

After calculation 350 ml of blood was collected from jugular vein in citrate-phosphate-dextrose-adenine bag (Fig. 5) and blood transfusion was done on emergency as per standard procedure (Fig. 1). Inj. Pheniramine maleate @1 ml IM and Inj. Dexamethasone @1mg/kg IM were given to recipient before administrating the blood to avoid the transfusion reaction. The animal was still observed continuously for restlessness, excitement, tachycardia, hyperpnoea etc. To rule out the adverse reaction during blood transfusion. After blood transfusion, 3<sup>rd</sup> day onwards dog showed improvement in clinical signs and haemato-biochemical values. The owner was advised to continue liver tonic for next ten days and follow up thereafter a week. After ten days owner informed that the dog has completely recovered (Fig. 6) and thriving well.

*Babesia* species are intra-erythrocytic parasites transmitted by ticks. In dogs, the two described species are – *Babesia canis*, a large species and *Babesia gibsoni*, a small one. The diagnosis of *Babesia* spp. infection is usually based on detection of merozoites in peripheral blood smear. The smears are usually prepared with blood taken from ear margin capillary bed.

In the present case, the clinical symptoms observed in this study were fever, anorexia, dullness, hemoglobinuria, icterus, anemia and thrombocytopenia which were also reported by (Peterson, 2006; Nelson and Couto, 2009). The values of Hb, PCV, TEC and total platelet count were significantly decreased in dog which came to normal after treatment.

The same has been observed by (Kshama, 2017; Venkatesakumar *et al.*, 2018). The elevated BUN and creatinine in our case were mainly due to babesiosis which causes damage to renal cells due to development of refractory hypotension resulting in reduced

renal tissue perfusion and glomerular filtration rate (Zygner and Wedrychowicz, 2009; Venkatesakumar *et al.*, 2018). Several mechanisms are said to contribute to anemia in babesiosis and these include immune-mediated destruction of erythrocytes, increased erythrocytic osmotic fragility, direct injury to erythrocytes by the parasites and oxidative injury (Birkenheuer, 2014). Thrombocytopenia observed in present case was in accordance with (Harrus *et al.*, 1997; Venkatesakumar *et al.*, 2018).

Treatment with immuno-suppressive doses of glucocorticoids is necessary along with anti-babesial therapy to manage haemolytic anemias (Birkenheuer, 2012). Imidocarb dipropionate is the active agent against *B. canis* and it can eliminate *B. canis* for up to four weeks following treatment and can prevent infection up to 6 weeks. It however does not clear *B. gibsoni* infection but only reduces the mortality and morbidity (Raskin, 2006; Birkenheuer, 2014). Hence it can be used as an alternate therapy when the drug of choice for *B. gibsoni*, Atovaquone is not available.

There are currently no alternative oxygen-carrier products, such as free hemoglobin, available for veterinary use. Whole blood transfusion has provided coagulation factors, plasma proteins, some white cells and platelets. So dogs with transfusions achieve higher PCVs and had better oxygen-carrying capacity to overcome the underlying disease (Cunha, 2011).

The recommended dose is 20 ml/kg to elevate the hematocrit by 10% (Abrams-Ogg, 2000). After the treatment all parameters came to their normal values with complete cessation of all clinical signs. Thus, blood transfusion along with Imidocarb treatment to affected dogs found best by decreasing the severity and favoring early recovery of dog.



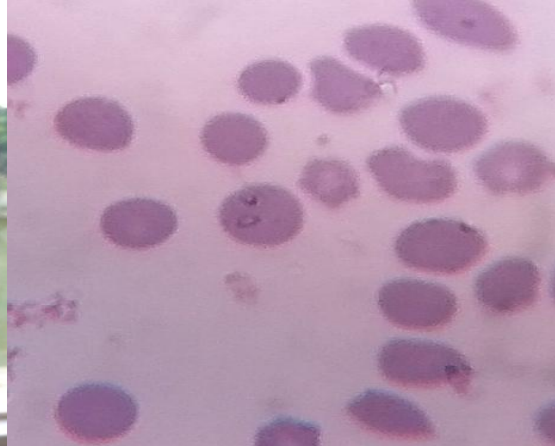
**Fig.1** Dog undergoing blood transfusion



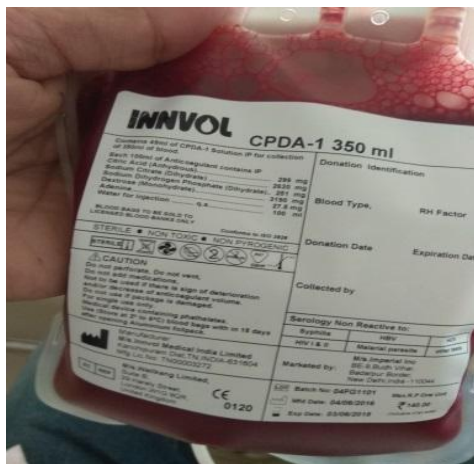
**Fig.2** Icteric mucous membrane



**Fig.3** Sample after centrifugation showing haemoglobinuria



**Fig.4** Blood smear examination indicating presence of *Babesia gibsoni* on blood cell



**Fig.5** Citrate-Phosphate-Dextrose Adenine blood bag



**Fig.6** Recovered dog after treatment



A case of Babesiosis in an adult male Labrador dog and its successful treatment with Imidocarb dipropionate, supportive therapy and life-saving blood transfusion has been discussed.

### Acknowledgements

The author is thankful to the Principal, KCVAS, Amritsar for providing necessary facilities to carry out this study.

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### How to cite this article:

Kanwarpal Singh Dhillon, Simran Jot Kaur, Alamjit Singh and Mukal Gupta. 2020. Successful Therapeutic Management of Babesiosis in a Labrador Dog along with Blood Transfusion. *Int.J.Curr.Microbiol.App.Sci*. 9(05): 2058-2062. doi: <https://doi.org/10.20546/ijcmas.2020.905.235>