CASE REPORT
JIVA 19 (2) August 2021

JIVA
OFFICIAL ORGAN OF INDIAN VETERINARY ASSOCIATION, KERALA

Received: 25/4/2021
Accepted: 29/05/2021

THERAPEUTIC MANAGEMENT INCLUDING BLOOD TRANSFUSION IN A ROTTWEILER PUP WITH *BABESIA GIBSONI* INFECTION- A FIELD STUDY

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ABSTRACT

A female Rottweiler pup was brought to the veterinary dispensary with hyporexia, pale mucous membrane, normal rectal temperature (100.5 ^{0}F), and splenomegaly. Examination of blood smear revealed *Babesia gibsoni* infection. Packed cell volume (PCV) was 20 per cent. Hence, blood transfusion was performed followed by combination therapy with doxycycline, clindamycin and, metronidazole orally for 30 days. Complete elimination of organism from the blood smear was achieved by the 30th day of treatment.

Keywords: Anemia, Babesiosis, dog, Hemoprotozoa, triple-therapy

INTRODUCTION

Canine babesiosis is a tick-borne, protozoal, hemoparasitic disease with worldwide distribution. Clinical manifestations vary with species and strains of *Babesia* involved. Apart from this, factors affecting the host's response to infection such as age, individual immune status, and presence of concurrent infections or disease also influence disease severity (Irwin, 2009). Hemolytic anemia with erythrocyte destruction and systemic inflammatory response that lead to organ dysfunction is the reason for most of the clinical symptoms in Babesiosis. Acute onset is manifested as fever and lethargy, followed by clinical manifestations of anemia; liver, pulmonary, kidney, and, brain dysfunctions (Baneth, 2018).Hemostatic abnormalities and electrolytic imbalances were also observed in dogs (Eichenberger *et al.,* 2016).

Traditionally, *Babesia* organisms are designated as small and large *Babesia*. All large forms of *Babesia* were designated as *B. canis* and, small forms as *B. gibsoni*. However, with the advent of molecular analysis and DNA sequencing technology, several species of Babesia were identified. Currently, the large forms of *Babesia*

reported in dogs include *B. canis*, *B. vogeli*, and *B. rossi*, and the small forms comprise *B. gibsoni*, *B. conradae*, and *B. vulpes* (Vishwakarma and Nandini, 2019; Panti-May and Rodríguez-Vivas, 2020). Larger forms of Babesia are sensitive to imidocarb and diminazeneaceturate, while smaller forms are relatively resistant (Plumb *et al*., 2015). Various treatment regimens using drugs with antiprotozoal activities like azithromycin, atovaquone, doxycycline, minocycline, clindamycin and, metronidazole were tried in the treatment of infections caused by small Babesia (Baneth, 2018).

Blood transfusion is appropriate in the treatment of chronic and acute anemia. Miller *et al*. (2009) reported that a PCV below 40 indicated mild anemia, and below 35 a moderate anemia. In an another report, Kaewmongkol *et al.* (2017) stated that a PCV below 15 indicated severe anemia, while a value between 16 and 29 indicated moderate anemia. The lack of blood typing and blood component separation facility in field condition leaves whole blood transfusion as the only practical procedure to save the life of animal.

Babesia gibsoni diagnosed by peripheral blood smear examination in a dog, managed by specific therapy along with blood transfusion is presented here.

CASE HISTORY AND OBSERVATION

A four-month-old Rottweiler female pup weighing 10 kg was brought to the veterinary dispensary with hyporexia, papery white mucous membrane, splenomegaly, and depression. A mild level of tick infestation was reported by the owner. Rectal temperature was normal (100.5 ^{0}F) and PCV was 20 per cent. Vaccination and deworming history were proper. Peripheral blood smear from ear vein was sent to the laboratory and *B. gibsoni* infection was confirmed microscopically by detecting the piroplasms.

TREATMENT AND DISCUSSION

A PCV below 35 in dogs is indicative of anemia (Miller *et al.,* 2009). In the present case, the onset of clinical signs was chronic. As the PCV of the pup was 20 percent and had hyporexia, it was decided to transfuse whole blood.

A nondescript dog of the owner with bodyweight (BW) 25 kg, PCV 45 percent, and negative for hemoprotozoan infection was selected as the donor. It was fasted overnight and sedated with xylazine (1 mg/ kg BW, intramuscular) followed by intravenous propofol at the dose rate of 2 mg/ kg BW (Neoprof, 10mg/ml preparation).A blood bag with Citrate Phosphate Dextrose Adenine (CPDA) solution as the anticoagulant at the rate of 49 ml for 350

ml blood (M/S HLL Life Care Limited, Trivandrum, Kerala) was used. Blood was collected from the jugular vein. The amount of blood required for transfusion was calculated using the formula 1.5 ml × %PCV rise × kg BW of the recipient (Short *et al.*, 2012). Here, the PCV of the recipient was 20%, and we aimed to raise it to 35% by blood transfusion. Therefore 225 ml blood was collected from the donor (i.e. 1.5 ml ×15×10 kg = 225 ml). As the donor weighed 25 kg and was healthy (PCV 45%), up to 250 ml of blood could be collected safely (at the rate of 10 ml/kg BW). Cross matching and blood typing were not attempted due to lack of facilities and for the fact that in dogs and cats, the first blood transfusion may not cause reaction because of the absence of preexisting alloantibodies (Safrany and Adamantos, 2020). There was no history of previous blood transfusion to form preexisting antibodies in the present case.

Intramuscular dexamethasone injectionwas given at the rate of 0.5 mg/ kg BW to the recipient animal thirty minutes before transfusion to prevent the incidence of any fatal reactions. Blood was transfused through the cephalic vein of the recipient at the rate of 1 ml/kg/h for the first fifteen minutes followed by 2 ml/kg/h till completion.

Immediately following blood transfusion, the dog was treated with Tab. Ranitidine (half an hour before food twice daily for 30 days), Tab. Clindamycin 300 mg (with food at the dose rate of 25 mg/kg BW, twice daily for 30 days), Tab. Doxycycline 100 mg (after food at the rate of 5 mg/kg BW BID for 30 days), and Tab. Metronidazole 400 mg (at the rate of 15 mg/kg BW, BID for 30 days). Liver stimulant tonic was supplemented during the entire treatment period as supportive therapy (Tefroli forte, M/S TTK). Previously, Babesiosis was treated using a combination of atovaquone and azithromycin. Wulansari *et al*. (2003) reported the possible emergence of atovaquone and azithromycin-resistant variants of *B. gibsoni*. Hence, triple therapy with clindamycin, metronidazole, and doxycycline with proven 87% success rate (Amlmendros *et al.,* 2020) was used in this case study. On the 20th and 30th days of treatment, peripheral blood smears from the ear vein was sent to the laboratory to ascertain the level of recovery.

The animal showed marked improvement in appetite and pallor of mucous membrane with treatment. By the 20th day, splenomegaly subsided almost completely. However, microscopic examination of peripheral blood smear showed 'stray' *B. gibsoni* infection and hence, treatment was continued for ten more days. By the 30th day of treatment, the blood smear was tested negative for *B.*

gibsoni infection.

SUMMARY

Triple therapy using metronidazole-clindamycin-doxycycline along with blood transfusion was effective for treating *B. gibsoni* infection of dogs in field conditions

ACKNOWLEDGEMENT

The authors are thankful to the Director, Animal Husbandry Department Kerala for providing the necessary support and facilities for the study. We are also thankful to Dr Ganesh and Dr Smitha, General Hospital Kasaragod for providing blood bags for the case.

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