CASE REPORT
JIVA 19 (2) August 2021

JIVA
OFFICIAL ORGAN OF INDIAN VETERINARY ASSOCIATION, KERALA

Received: 08/06/2021
Accepted: 11/06/2021

SUCCESSFUL MANAGEMENT OF *BABESIA GIBSONI* INFECTION IN A DOG WITH BUPARVAQUONE-CLINDAMYCIN COMBINATION ALONG WITH BLOOD TRANSFUSION - A CASE STUDY

Anju S.[1*] and Vijayakumar K.[2]

[1]M.V.Sc. Scholar, [2] Professor and Head,
Department of Veterinary Preventive Medicine and Epidemiology,
College of Veterinary and Animal Sciences, Mannuthy, Thrissur- 680651
Kerala Veterinary and Animal Sciences University, Pookode, Wayanad, Kerala.
**Corresponding author: anju.redroses.s7@gmail.com*

ABSTRACT

Babesiosis is one of the most important tick-borne intra erythrocytic haemoprotzoal diseases in dogs caused by *Babesia gibsoni* (small Babesia) and *Babesia canis* (large Babesia) which produces haemolytic anaemia. A two-year-old male Rottweiler was presented to the hospital with history of inappetance and weakness. Clinical examination revealed pale mucous membrane, fever and lymphadenopathy. Peripheral blood smear examination revealed intra erythrocytic *Babesia gibsoni* infection. Complete blood count examination revealed anaemia and thrombocytopaenia. Initially treated with diminazine aceturate at 3.5 mg/kg BW IM showed poor response and the patient was re-presented to the hospital after four days with severe anaemia and fever. Buparvaquone was given intramuscularly at the dose rate of 3 mg/kg BW IM followed by Inj. clindamycin at 11 mg/kg BW IV OD for three days and followed by oral clindamycin tab @ 25 mg/kg BW OD for 14 days. As the recorded PCV was only 6.2 per cent whole blood transfusion was performed on the same day itself. Clinical improvement was noticed on the third day itself with increased food intake and activity. Blood smear examination on the 10th day revealed absence of *B. gibsoni* organisms with the rise in PCV to 22.5 per cent. The dog was given oral haematinics for 10 more days and further no relapse of the condition was noticed by the owner. Further treatment was not advised since the blood values and clinical condition of the animal was satisfactory.

Keywords: Canine babesiosis, Buparvaquone-clindamycin combination, Whole blood transfusion

INTRODUCTION

Babesiosis is one of the most important tick-borne intra erythrocytic haemoprotzoal diseases in dogs which occurs globally caused by *Babesia gibsoni* (small Babesia) and *Babesia canis* (large Babesia) which produces haemolytic anaemia (Parvathy *et al*., 2019). The clinical signs of babesia infection in dogs may vary from anorexia, pyrexia, malaise, anaemia, icterus, splenomegaly and haemoglobinuria to systemic inflammatory response (SIRS) leading to multiple organ dysfunction (Gonde *et al*., 2016). Effective treatment aims in the elimination of parasites, correction of life threatening anaemia with blood transfusion and supportive therapy with oral haematinics.

CASE HISTORY AND OBSERVATION

A male Rottweiler dog age 8 months was presented with history of inappetance and fever since five days. Clinical examination revealed pale mucous membrane, peripheral lymphadenopathy and elevated rectal temperature (104.2^0 F). examination of the peripheral blood smear revealed intra erythrocytic piroplasms of *Babesia gibsoni* (++) (Fig. 1). Complete blood count examination revealed anaemia and thrombocytopaenia. Serum biochemical values of creatinine (0.91 mg/ml) and blood urea nitrogen (17.63 mg/ml) was found to be within the normal range.

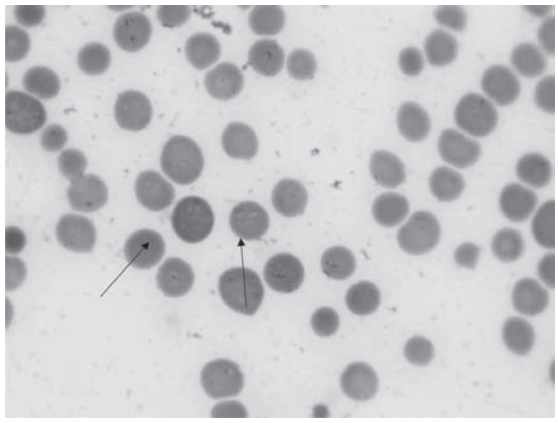

Fig. 1-Singnet ring shaped *Babesia gibsoni* organisms in RBCs

TREATMENT AND DISCUSSION

On the first day of presentation it was treated with diminazine aceturate at 3.5 mg/kg BW followed by Inj. clindamycin IV at 11 mg/kg BW but showed poor response and the patient was bought to the hospital on the fourth day with severe weakness, anorexia and anaemia. Buparvaquone was given at 3 mg/kg BW IM. The packed cell volume had declined to 6.2 per cent from 11.8 per cent on the first day of presentation indicating an intravascular haemolysis. A healthy male Labrador retriever of age 2 years and weight 42 kg was selected as donor with a PCV of 42 per cent and 350 ml of blood was collected from the jugular vein into a CPDA-blood pack unit. The volume of blood to be transfused was determined by the standard formula given by short *et al*. 2012.

Transfusion was started at the rate of 0.25 ml/kg/hr for the initial thirty minutes and increased to a higher rate of 10 ml/kg/hour over a time period of four hours. Animal was continuously monitored for transfusion reactions. Total 350 ml of whole blood was transfused in a duration of four hours with close monitoring of the vital signs of the patient for any transfusion reactions. Marked clinical improvement was noticed on the next day with increased food intake and activity. Peripheral blood smear examination on the 10th day could not find any piroplasms. Complete blood count evaluation showed positive response with the rise in PCV to 24 per cent. Owner was advised to continue oral clindamycin at 25 mg/kg BW for 14 days and continue oral heamatinic suspension haemobest pet at 5 ml OD PO and advised to report if clinical signs recurred.

The present case deals with the diagnosis and treatment of canine *Babesia gibsoni* infection. The common clinical signs noticed were anorexia, pyrexia, lymphadenopathy, pallor of mucous membrane, lethargy, vomiting, diarrhoea, voiding of dark yellow coloured urine, haemoglobinuria, seizures etc. Wozniak et al. (1997), Parvathy et al. (2019). De Gopegui et al. (2007) commented that in case of uncomplicated *Babesia gibsoni* infection the clinical signs manifested were mainly due to haemolytic anaemia in which pyrexia would be a predominant clinical sign followed by lethargy, anorexia, icterus and spleenomegaly. The cause of haemolytic anaemia could be due to the destruction of erythrocytes due to action of autoantibodies, activity of macrophages, spleenic sequestration of the parasitised RBCs and the deficiency of Glucose-6- phosphate dehydrogenase enzyme (Rafaj *et al.,* 2013). Welz *et al*. (2001) explained two types of babesiosis, uncomplicated babesiosis mainly due to haemolytic anaemia and complicated babesiosis manifested with different organ impairment due to the exaggerated immune response of the body. The systemic complications were more often associated with a poor prognosis than severe anaemia alone without the impairment of internal organ. Complications involve hepatopathy, pulmonary oedema, acidosis, acute renal insufficiency etc. The conventional therapies were reported to reduce the severity of the

Parameters	1st Day	Day of transfusion (4th day)	14th day
RBC (x 106/mm3)	2.61	0.92	3.89
Hb (g/dL)	4.23	2.91	7.64
PCV (%)	11.8	6.2	24
PLT (x 103/µl)	192	96	326

disease and resolution of clinical signs, however were not capable of sterilising the infection thus resulting in relapse of the disease (Schoeman *et al.*, 2009). A broad understanding in treatment protocols, drug availability, convenience to use, dosage regimes of the drug and its side effects should be considered while implementing a proper treatment plan (Kumara, 2016). Clindamycin, a lincomycin antibiotic acts by binding to the 50S ribosomal units of *B. gibsoni* thus inhibiting peptide bond formation and induce degenerative changes in the parasites demonstrated by the morphological changes such as segmentation of the nucleus, nuclear size reduction etc.in Giemsa stained blood smears post treatment. The drug is also reported to enhance the immune system of the body by stimulating humoral and cellular immunity hence helps in elimination of clinical signs (Wulansari *et al.,* 2003). Diminazine aceturate being the treatment of choice for canine babesiosis caused by large *Babesia* spp, is unable to eliminate *B. gibsoni* completely from the infected dogs and obtain only temporary improvement (Suzuki *et al.*, 2007). Checa *et al.* (2017) evaluated the tolerance and efficacy of buparvaqoune at a higher dosage of 5 mg/kg body weight in combination with azithromycin in treating dogs infected with *Babesia microti* and reported a better clinical and parasitological efficacy than imidocarb dipropionate. A similar study was conducted by Parvathy (2019) and found that buparvaquone in combination with azithromycin had a similar and comparable efficacy to Buparvaquone when used alone at the dose rate of 5mg/ kg for the treatment of *B. gibsoni* infection.

Whole blood or packed RBC transfusion is indicated when the Packed Cell Volume falls below 10 per cent. The survival rate and clinical outcome of such patients are improved with by this procedure. Prior to blood collection the donor should be examined for haemoprotozoans and ideally blood can be collected upto 10 per cent of the total blood volume (Short *et al*., 2012). In a broad sense the approach for the control of babesiosis acarcidal therapy to control transmission by ticks, chemoprophylaxis targeting the parasite, blood transfusion to reduce anaemia, vaccine development and by avoiding tick active areas with behavioral preventive methods (Petra *et al*., 2018).

SUMMARY

Canine babesiosis is the most common haemoparasitic infection and mainly caused by *B canis* and *B gibsoni* organisms. The clinical signs of babesia infection in dogs may vary from anorexia, pyrexia, malaise, anaemia, icterus, splenomegaly and haemoglobinuria to

systemic inflammatory response (SIRS) leading to multiple organ dysfunction. The approach for control of babesiosis acarcidal therapy to control transmission by ticks, chemoprophylaxis targeting the parasite, blood transfusion to reduce anaemia, vaccine development and by avoiding tick active areas with behavioral preventive methods.

ACKNOWLEDGEMENT

The authors are thankful to the Dean, College of Veterinary and Animal Sciences, Mannuthy for providing the facilities for this study.

REFERENCES

Checa, R., Montoya, A., Ortega, N., González-Fraga, J. L., Bartolomé, A., Gálvez, R. and Miró G. 2017. Efficacy, safety and tolerance of imidocarb dipropionate versus atovaquone or buparvaquone plus azithromycin used to treat sick dogs naturally infected with the Babesia microti-like piroplasm. *Parasites and Vectors*. **10**(1): 1-12.

de Gopegui, R.R., Penalba, B., Goicoa, A., Espada, Y., Fidalgo, L.E. and Espino, L. 2007. Clinico-pathological findings and coagulation disorders in 45 cases of canine babesiosis in *Spain. Vet. J.* **174**(1): 129-132.

Gonde, S., Chhabra, S., Uppal, S. K., Singla, L. D. and Randhawa, S. S. 2016. A unique case of Babesia gibsoni infected dog with paraplegia. *Journal of Parasitic Diseases*, **40**(4): 1605-1608.

Kumara, W. R. 2016. Antibabesial treatment protocols against canine babesiosis. *Sri Lanka Vet. J*. **63**(1): 15-21.

Parvathy, E. K., Pillai, U. N., Unny, N. M., Rajan, S. K. and Tresamol, P. V. 2019. Haematological analysis of Babesia gibsoni infected dogs. *The Pharma Innovation J*. **8**(12): 211-214.

Petra, B., Josipa, K., Renata, B. R. and Vladimir, M. 2018. Canine babesiosis: where do we stand? *Acta Veterinaria*, **68**: 127-160.

Rafaj, R.B., Kules, J., Selanec, J., Vrkic, N., Zovko, V., Zupancic, M., Trampusbakija, A., Matijatko, V., Crnogaj, M. and Mrljak, V. 2013. Markers of coagulation activation, endothelial stimulation, and inflammation in dogs with babesiosis. *J. Vet. Intern. Med*. **27**: 1172-1178.

Schoeman, J. P. 2009. Canine babesiosis. Onderstepoort *J. Vet. Res*. **76**: 59-66.

Short, J. L., Diehl, S., Seshadri, R. and Serrano, S. 2012. Accuracy of formulas used to predict post-transfusion packed cell volume rise

in anemic dogs. *Journal of Veterinary Emergency and Critical Care*, **22**(4): 428-434.

Suzuki, K., Wakabayashi, H., Takahashi, M., Fukushima, K., Yabuki, A. and Endo, Y. 2007. A Possible treatment strategy and clinical factors to estimate the treatment response in Babesia gibsoni infection. *J. Vet. Med. Sci*. **69**: 563-568.

Welzl, C., Leisewitz, A. L., Jacobson, L. S., Vaughan-Scott, T. and Myburgh, E. 2001. inflammatory response syndrome and multiple-organ damage/dysfunction in complicated canine babesiosis. *J. S. Afr. Vet. Ass.* **72**: 158-162.

Wozniak, E. J., Barr, B. C., Thomford, J. W., Yamane, I., McDonough, S. P., Moore, P. F., Naydan, D., Robinson, T.W. and Conrad, P. A. 1997. Clinical, anatomic, and immunopathologic characterization of Babesia gibsoni infection in the domestic dog (Canis familiaris). *J. Parasitol*. **83**: 692-699.

Wulansari, R., Wijaya, A., Ano, H., Horii, Y., Nasu, T., Yamane, S. I. and Makimura, S. 2003. Clindamycin in the treatment of Babesia gibsoni infections in dogs. *J. Am. Ani. Hospital Ass.* **39**: 558-562.