SHORT COMMUNICATION

Occurrence of Canine Babesiosis in Dogs of Jaipur

Vikram Singh Gurjar[1*], Rashmi Singh[1], Nirmal Kumar Jeph[1], Sandeep Kumar Sharma[2], Chandra Shekhar Sarswat[3], Akanksha Choudhary[1], Devendra[1]

Abstract

The present study was conducted on dogs suspected for babesiosis (n=200) presented at PGIVER, and Govt. Veterinary Polyclinic, Jaipur with the history of inappatance to anorexia, pyrexia, tick infestation, lethargy and signs of anaemia. Of these, sixteen dogs were confirmed for babesiosis by conventional microscopic technique. The prevalence of babesiosis was found to be 8% (16/200). The highest prevalence was found in age group of 2-5 years (50%). Among the various breeds affected, Labrador retriever constituted the maximum of 8/16 (50%) cases in total, and female gender was more susceptible to babesiosis as compared to males.

Key words: Babesiosis, Canine, Jaipur, Occurrence.

Ind J Vet Sci and Biotech (2023): 10.48165/ijvsbt.19.3.20

Introduction

Amongst the various prevalent canine vector-borne diseases, canine babesiosis is a clinically significant disease caused by intra-erythrocytic protozoa belonging to genus *Babesia*. *Babesia canis* (large 3.0-5.0 µm) and *B. gibsoni* (small 1.5-2.5 µm) are recognized to cause canine babesiosis worldwide (Jefferies *et al*., 2003). *Dermacentor reticulatus, Rhipicephalus sanguineus,* and *Haemaphysa lisleachi* ticks are the carriers of the *Babesia* infection. Each *Babesia* species typically has a unique tick vector.

The epidemiology or incidence of canine babesiosis has been sporadically studied in various remote areas, cities, or towns of this country, with the majority of the research concentrating on populations of stray, feral, and wandering dogs as well as on household pets that were brought to veterinary clinics. In dogs, babesiosis is reported worldwide (Garcia, 2006) including various parts of India (Harikrishnan *et al*., 2005) and Rajasthan state (Godara *et al*., 2010; Yoak *et al*., 2014). Infection with *Babesia* has been recognized with a variety of clinical signs, ranging from subclinical disease to serious illness characterized by fever, pallor, jaundice, splenomegaly, weakness, and intravascular and extravascular hemolysis, hypoxic injury, systemic inflammation, thrombocytopenia, and pigmenturia (Irwin, 2009). This communication reports prevalence of canine babesiosis in dogs of Jaipur.

Materials and Methods

A total of 200 dogs of either sex suspected for babesiosis were studied at Veterinary Clinical Complex, Post-Graduate Institute of Veterinary Education and Research (PGIVER) and Govt. Veterinary Polyclinic, Jaipur (Rajasthan, India) over a period of six months. After a comprehensive history, detailed clinical manifestations such as inappatance to anorexia, pyrexia, tick infestation, lethargy and signs of anaemia were noted and clinical parameters (rectal temperature, respiration rate and heart rate) were recorded. Diagnosis was made on the basis of clinical signs and demonstration of *Babesia* organism in Giemsa stained thin blood smears (Fig. 1).

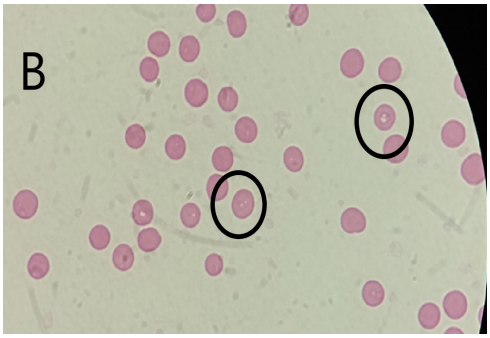

Fig. 1: Giemsa stained blood smear showing *Babesia* organism inside the erythrocyte

[1]Department of Veterinary Medicine, Post-Graduate Institute of Veterinary Education and Research (PGIVER), Jaipur-302031, Rajasthan, India.

[2]Department of Veterinary Gynaecology and Obstetrics, Post-Graduate Institute of Veterinary Education and Research (PGIVER), Jaipur-302031, Rajasthan, India.

[3]Department of Veterinary Microbiology and Biotechnology, Post-Graduate Institute of Veterinary Education and Research (PGIVER), Jaipur-302031, Rajasthan, India

Corresponding Author: Vikram Singh Gurjar, Department of Veterinary Medicine, Post-Graduate Institute of Veterinary Education and Research (PGIVER), Jaipur-302031, Rajasthan, India, e-mail: vikramgurjar4795@gmail.com

How to cite this article: Gurjar, V.S., Singh, D.R., Jeph, N.K., Sharma, S.K., Sarswat, C.S., Choudhary, A., & Devendra. (2023). Occurrence of Canine Babesiosis in Dogs of Jaipur. Ind J Vet Sci and Biotech. 19(3), 90-92.

Source of support: Nil

Conflict of interest: The author(s) declare that there is no conflict of interest.

Submitted: 10/01/2023 **Accepted:** 20/02/2023 **Published:** 10/05/2023

Results and Discussion

Prevalence of Babesionsis

The blood smears were evaluated under 100 x oil immersion fields, and babesiosis was diagnosed when parasitemia with the *babesia* organism was seen microscopically in at least one erythrocyte cell. Out of total 200 blood samples of suspected dogs screened, parasitemia was found in 16 cases confirming 8.00% prevalence of babesiosis. Similar findings have been reported throughout India. Selvaraj *et al.* (2010) in Chennai (Tamil nadu), Singh *et al.* (2014) from Punjab State, Shrivastava *et al.* (2014) from Jabalpur (Madhya Pradesh), and Panda *et al.* (2021) in and around Bhubaneswar (Orissa) reported the prevalence of 8.70, 7.50, 10.60 and 8.08 % canine babesiosis, respectively. On the other hand, previously Godara *et al.* (2010) reported 13.10% prevalence and Yoak *et al.* (2014) noted 10.00% prevalence in Jaipur, which is more close to our present finding.

Age-wise incidence revealed that the oldest dog suffered from babesiosis was 13 years old, while the youngest dog was 9 months old, and higher incidence was seen in the age group of 2-5 years (50.00%) among the total positive cases. Similar findings were reported by Sandor Hornok *et al.* (2006), Senthil Kumar *et al.* (2009) and Das *et al.* (2015) in adult dogs. In order of susceptibility in the present study, age-wise incidence observed was 12.50% in below 1 year, 6.25% in 1 to ≤ 2 year age group, 50.00% in 2-5 year age group, and 31.25% in more than 5 years of age group.

In the present study, out of confirmed cases, 7/16 (43.75%) were male dogs and 9/16 (56.25%) were females, which indicated that female dogs had a higher incidence than males. Similar observations have been recorded by Singh *et al.* (2012) from Punjab, Das *et al.* (2015) from Kolkata, Shrivastava *et al.* (2014) from Jabalpur (Madhya Pradesh) and Kumar *et al.* (2015) from Jalandhar (Punjab). In contrast, Ilie *et al.* (2010) and Nalubamba *et al.* (2015) found that male dogs had higher incidences of babesiosis than female dogs, but a few scientists have found that there is no sex predisposition for *Babesia* spp. infection (Sandor Hornok *et al.,* 2006; Senthil Kumar *et al.,* 2009; Singh *et al.,* 2014).

Among the various breeds affected, Labrador retriever constituted the maximum of 8/16 (50.00%) cases in total, which could be due to more number of dogs of this breed presented, followed by German shepherd 3/16 (18.75%), non-descript breeds 3/16 (18.75%), Rottweiler 1/16 (6.25%), and Doberman 1/16 (6.25%). According to Singh *et al.* (2014) and Mahalingaiah *et al.* (2017) Labrador breed had the highest incidence of babesiosis.

Clinical Parameters in Canine Babesiosis

The results on clinical parameters presented in Table 1 revealed significant (p≤0.05) rise in rectal temperature, heart rate and respiration rate in babesiosis infeccted dogs as compared to normal healthy dogs. Our findings corroborate with those of Gonde (2014) and Reddy *et al.* (2016). The presence of parasites in the bloodstream as foreign bodies may be the cause of the fever, causing the production of cytokines and other vasoactive amines (Konto *et al.,* 2014).

Table 1: Effect of babesiosis on clinical parameters of dogs

Parameters	Rectal temperature (°F)	Heart rate (per min)	Respiration rate (per min)
Control Group	101.55±0.27°F	105.67±2.7	29.00±1.53
Infected Group	104.27±0.21°F**	163.75±5.29**	64.50±1.63**

**p≤0.01 between groups.

Similar to our observations, many authors (Wadhwa *et al.,* 2011; Vijayalakshmi *et al*., 2014) reported tachycardia (>120/min) in dogs infected with babesiosis. It is possible that the parasitic infection is responsible for the elevated heart rate. Varshney *et al.* (2008), Wadhwa *et al.* (2011) and Gonde (2014) also reported polypnoea in dogs infected with babesiosis. This increase in respiration rate could be due to the fact that the majority of the erythrocytes were infected with *Babesia* species, which reduced the oxygen-caring capacity. As a result, the oxygen demand increased, and the respiration rate may have increased to compensate oxygen demand.

From the present study it is concluded that *Babesia* infection in canines can be diagnosed on the basis of microscopy, as a specific, cheapest and a rapid diagnostic tool. The overall prevalence of canine babesiosis found was 8.00% (16/200) in Jaipur with higher prevalence in Labrador retriever and in 2-5 years age group.

Acknowledgement

Authors are thankful to the Dean, Post-Graduate Institute of Veterinary Education & Research (*PGIVER*), Jaipur for providing facilities to carry out this work.

References

Das, M.K., Baidya, S., Mahato, A., Pandit, S., Ghosh, J.D., Chaudhuri, S., & Das, M. (2015). Incidence of canine babesiosis in and around Kolkata, West Bengal, India. *Exploratory Animal and Medical Research*, *5*(1): 102-107.

Garcia, A.T. (2006). Piroplasma infection in dogs in Northern Spain. *Veterinary Parasitology*, *138*(1-2): 97-102.

Godara, R., Sharma, R.L., Sharma, C.S., & Sharma, D.K. (2010). Parasitic infections in dogs in semi-arid Jaipur (Rajasthan). *Journal of Veterinary Parasitology*, *24*(1): 83-86.

Gonde, S. (2014). Studies on clinico-haemato-biochemical changes and therapeutic management of babesiosis in dogs. *M.V.Sc. Thesis*. Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana (Punjab), India.

Harikrishnan, T.J., Pazhanivel, N., & Chellappa, J. (2005). Concomitant *Babesia gibsoni* and *Ehrlichia canis* infection in a dog. *Veterinarski Arhiv*, *75*(6), 513.

Ilie, M.S.D.G., Imre, M., Imre, K., Hotea, I., & Sorescu, I.D. (2010). Survey of canine babesiosis in Banat area. *Bulletin UASVM-CN, Veterinarni Medicina*, *67,* 125-130.

Irwin, P.J. (2009). Canine babesiosis: from molecular taxonomy to control. *Parasites & Vectors*, *2*(1), 1-9.

Jefferies, R., Ryan, U.M., Muhlnickel, C.J., & Irwin, P.J. (2003). Two species of canine babesia in Australia: Detection and characterization by PCR. *Journal of Parasitology*, *89*(2), 409-412.

Konto, M., Biu, A.A., Ahmed, M.I., Mbaya, A.W., & Luka, J. (2014). Clinico-biochemical responses of dogs to experimental infection with *Babesia canis*. *Veterinary World*, *7*(3), 201-205

Kumar, P., Kumar, V., Gopal, H., Sharma, H., & Wadhawan, V.M. (2015). Prevalence of canine babesiosis in and around Jalandhar (Punjab), India. *Veterinary Clinical Science*, *3*(1), 1-3.

Mahalingaiah, M.K.C., Asoor, M., Thimmaiah, R.P., Narayanaswamy, H.D., Mukartal, S.Y., Elattuvalappil, A.M., & Singh, S. (2017). Prevalence of canine babesiosis in different breeds of dogs in and around Bengaluru. *Advances in Animal and Veterinary Sciences*, *5*(3), 140-144.

Nalubamba, K.S., Mudenda, N.B., Namwila, M.M., Mulenga, C.S., Bwalya, E.C., Kandawire, E.M., Saasa, N., Hancangam, C., Oparaocha, E., & Simuunza, M. (2015). A study of naturally acquired canine babesiosis caused by single and mixed babesia species in Zambia: Clinico-pathological findings and case management. *Journal of Parasitology Research*, *9*, 236-249.

Panda, C., Dehuri, M., Panda, M.R., Sahoo, L.K., & Mohanty, B. (2021). Molecular detection of canine babesiosis in and around Bhubaneswar, India. *Indian Journal of Veterinary Science and Biotechnology*, *17*(3), 69-72.

Reddy, B.S., Sivajothi, S., Reddy, L.V., & Raju, K.S. (2016). Clinical and laboratory findings of babesia infection in dogs. *Journal of Parasitic Diseases*, *40*(2), 268-272.

Sandor Hornok, Edelhofer, R., & Farkas, R. (2006). Seroprevalence of canine babesiosis in Hungary suggesting breed predisposition. *Parasitology Research*, *99*(6), 638-642.

Selvaraj, P., Kumar, K.S., Vairamuthu, S., Prathaban, S., & Srinivasan, S.R. (2010). *Babesia gibsoni* - An emerging challenge in canine pediatric practice in Chennai, Tamilnadu. *Journal of Veterinary and Animal Sciences*, *6*(3), 122-124.

Senthil Kumar, K., Vairamuthu, S., & Kathiresan, L.D. (2009). Prevalence of haemoprotozoans in canines in Chennai City, Tamilnadu. *Journal of Veterinary and Animal Sciences*, *5*(3), 104-108.

Shrivastava, S., Shukla, P.C., & Rao, M.L.V. (2014). An epidemiological study on canine hemoprotozoa in Jabalpur (Madhya Pradesh). *International Journal of Agricultural Sciences and Veterinary Medicine*, *2*(4), 1-7.

Singh Amritpal, Singh Harkirat, Singh, N.K., Singh, N.D., & Rath, S.S. (2014). Canine babesiosis in northwestern India: Molecular detection and assessment of risk factors. *BioMed Research International,* doi: 10.1155/2014/741785. Epub 2014 Jun 12.

Singh, H., Haque, M., Singh, N.K., & Rath, S.S. (2012). Occurrence of parasitic infections in dogs in and around Ludhiana, Punjab (India). *Applied Biological Research*, *14*(1), 108-110.

Varshney, J.P., Deshmukh, V.V., & Chaudhary, P.S. (2008). Multisystemic effects of canine babesiosis and management of critical cases. *Intas Polivet*, *9*(2), 281-87.

Vijayalakshmi, P., Srinivasan, S.R., Vairamuthu, S., Mangalagowri, A., Latha, B.R., & Nambi, A.P. (2014). Clinico-pathological features in dogs associated with babesiosis. *The Indian Veterinary Journal*, *91*(4), 21-24.

Wadhwa, D.R., Pal, B., Mandial, R.K., & Adarsh. K. (2011). Clinical, haemato-biochemical and therapeutic studies on canine babesiosis in Kangra valley of Himachal Pradesh. *Journal of Veterinary Parasitology*, *25*(1), 39-41.

Yoak, A.J., Reece, J.F., Gehrt, S.D., & Hamilton, I.M. (2014). Disease control through fertility control: Secondary benefits of animal birth control in Indian street dogs. *Preventive Veterinary Medicine*, *113*(1), 152-156.