EPIDEMIOLOGICAL AND VECTOR STUDIES ON CANINE BABESIOSIS*

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Abstract

Out of 116 dogs screened for babesiosis by blood smear examination, using Giemsa's stain over a 15 month period from October, 2011 to December, 2012 in Thrissur, 34 (29.31%) were found positive. Among these 30 (88.23%) were found positive for Babesia gibsoni and four (11.76%) for B. canis. The cases were grouped on the basis of their age, sex, breed and season of occurrence. No significant difference in the proportion of positive cases among different breeds, age, sex and seasons were observed. Predominant vector of the disease was found to be Rhipicephalus sanguineus. All ticks from B.gibsoni positive cases were identified as Haemaphysalis bispinosa

Keywords: *Babesia gibsoni, B. canis, ticks, epidemiology.*

Babesia species are tick-transmitted apicomplexan parasites infecting a wide range of wild and domestic animal hosts. Canine piroplasms belong to two distinct species, the large (2.5-5µm) *B. canis* and the small (1-2.5µm) *B. gibsoni*. Differences in geographical distribution, vector specificity, genetic characteristics and clinical manifestations have subdivided the former species into three subspecies, namely *B. canis canis* transmitted by *Dermacentor reticulates* in Europe, *B. canis vogeli* transmitted by *Rhipicephalus sanguineus* in tropical and subtropical regions and *B. canis rossi* transmitted by *Haemaphysalis leachi* in South Africa. *Babesia gibsoni* occurs in Asia, North America, Northern and Eastern Africa, Australia and Europe. The purpose of the present study was to find out the prevalence of canine babesiosis in relation to various parameters for future prophylaxis and to identify responsible vector species.

Materials and Methods

Prevalence of babesiosis was studied among the dogs presented to the Kerala Veterinary and Animal Sciences University Veterinary Hospitals at Mannuthy and Kokkalai and hospitals attached to the Department of Animal Husbandry in Thrissur District from October 2011 to December 2012.

Blood samples collected from 116 dogs showing clinical signs suggestive of babesiosis such as pyrexia, haemoglobinuria, pale mucous membranes, general weakness, anorexia and tick infestation formed the material for the study. A brief clinical history of the cases was also recorded, besides attending to factors such as age, sex and breed of the suspected animals. Season-wise prevalence was also studied.

Thin peripheral smears were prepared, air-dried and fixed with methanol. The blood smears were stained following the standard Giemsa's staining method and examined under the oil immersion objective of a light microscope to detect the presence of babesial piroplasms.

Partially engorged ticks were collected manually from the body of dogs suspected for babesiosis at the time of blood collection. They were carried to the laboratory in clean plastic vials covered with a piece of muslin cloth and

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identified under a stereozoom microscope. Ticks were also cleared by boiling in 10 per cent potassium hydroxide for detailed study. Identification was carried out using standard keys of Sen and Fletcher (1962). The data pertaining to the epidemiological study (age, sex, breed and season) were compared on the basis of chi-square test.

Results and Discussion

Epidemiological study

The breed-wise, age-wise, sex-wise and season-wise prevalence of *Babesia* spp. infection in dogs in and around Thrissur are presented in Table 1-3 respectively. However, statistical analysis revealed that there was no significant difference in the occurrence of *Babesia* spp. infection in dogs between breeds, age groups, both sexes and different seasons.

Yamane *et al*. (1994) had reported that breed was not associated with seropositive reactions to canine babesiosis which is in agreement with the results of the present study.

Agbo *et al*. (2007) and Adaszek *et al*. (2011) had observed a high prevalence of *B. canis* among German Shepherds. The increased prevalence of chronic babesiosis in German Shepherds has been attributed to genetic predisposition with long-term maintenance of their seropositivity (Hornok *et al*., 2006). The finding of higher percentage of *B. canis* infection in German Shepherds in the present study though not significant statistically is in agreement with the above mentioned reports.

In the present study, no significant difference was observed between the proportion of *B. gibsoni* and *B. canis* positive cases in dogs up to two years and above two years of age. This is in accordance with O'Dwyer *et al*. (2009) who reported that there was no relationship between age and gender to the disease.

No significant difference in the proportion of *B. gibsoni* and *B. canis* positive cases among male and female dogs was observed in this study. This is in agreement with the findings of Martinod *et al.* (1986), Yamane *et al*. (1994) and Agbo *et al*. (2007). On the contrary, Bashir *et al*. (2009), Cardoso *et al*. (2010) and Adaszek *et al*. (2011) had observed a higher incidence of disease in male dogs.

There was no significant seasonal difference in the present study, though a slight increase of *B. gibsoni* prevalence was observed during pre-monsoon (February-May). This concurs with the findings of Ahmad *et al.* (2011) who observed that incidence of canine babesiosis was high during summer and

Table 1. Breed-wise prevalence of *B. gibsoni* and *B. canis*

Name of the Breed	No. Examined	No. Positive for *B. gibsoni* (%)	No. Positive for *B. canis* (%)
Rottweiler	32	9 (40.90)	0 (0.00)
Labrador Retriever	22	8 (25.00)	1 (3.12)
German Shepherd	26	7 (26.92)	2 (7.69)
Cocker Spaniel	3	1 (33.33)	0 (0.00)
Pug	3	1 (33.33)	0 (0.00)
Great Dane	2	1 (50.00)	1 (50.00)
Spitz	2	1 (50.00)	0 (0.00)
St. Bernard	1	1 (100.00)	0 (0.00)
Dachshund	13	0 (0.00)	0 (0.00)
Doberman Pinscher	5	0 (0.00)	0 (0.00)
Pig bull	2	0 (0.00)	0 (0.00)
Pit bull Terrier	1	0 (0.00)	0 (0.00)
Dalmatian	1	0 (0.00)	0 (0.00)
Non- descript	3	1 (33.33)	0 (0.00)
Total	**116**	**30 (25.86)**	**4 (3.45)**

Table 2. Age-wise and sex-wise prevalence of *B. gibsoni* and *B. canis*

No. examined	<2 yrs	>2 yrs	Male	Female
Age & Sex	60	56	66	50
+ve B. gibsoni	17 (28.33)	13 (23.21)	20 (30.30)	10 (20.00)
+ve B. canis	3 (5.00)	1 (1.78)	2 (3.03)	2 (4.00)

Table 3. Season-wise prevalence of *B. gibsoni* and *B. canis*

Season	No. examined	No. Positive for *B. gibsoni* (%)	No. Positive for *B. canis* (%)
Pre-monsoon (February-May)	19	7 (36.84)	2 (10.52)
Monsoon (June- September)	19	4 (21.05)	2 (10.52)
Post-monsoon (October-January)	78	19 (24.36)	0 (0.00)

autumn when compared to other seasons. The increase in the incidence of canine babesiosis during summer could be due to the increased activity of ticks during that period.

Vector identification

From a total of 50 ticks collected from *Babesia* suspected dogs, 29 (58%) ticks were identified as *Rhipicephalus sanguineus*, 20 (40%) as *Haemaphysalis bispinosa* and one (2%) as *R. haemaphysaloides* (male). Ticks identified in the study concurred with the findings of Oyamada *et al*. (2005), Agbo *et al*. (2007), Bashir *et al*. (2009) and Kelly *et al*. (2013). The highest percentage of tick species observed was *R. sanguineus*. This is in accordance with Kelly *et al*. (2013) who reported that *R. sanguineus* was the principal species transmitting *Babesia* spp. infections in dogs. Interestingly, all the ticks collected from *B. gibsoni* positive animals were *H. bispinosa*. This observation is in agreement with the findings of Solano-Gallego and Baneth (2011) who stated that *Haemaphysalis* spp. were the vectors of *B. gibsoni*.

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