

Epidemiological Study on Canine Babesiosis in Jaipur, Rajasthan, India

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ABSTRACT

The present study was conducted on dogs suspected for babesiosis (n=100), in Jaipur (Rajasthan, India) presented with the history of inappetence to anorexia, pyrexia, tick infestation, lethargy and signs of anaemia. Out of 100 dogs, 24 (24%) were found positive for *Babesia* spp., which were confirmed by polymerase chain reaction. The highest incidence of canine babesiosis was seen in the age group of 1-5 years (29.16%), sex-wise in male dogs (25.92%) and breed-wise in Labrador Retrievers (34.78%). Clinical observations in 24 babesiosis positive dogs revealed anorexia in 23 dogs, fever/pyrexia and tick infestation in 21 dogs, depression and lethargy in 19 dogs, lymphadenopathy in 15 dogs and pale mucous membrane in 9 dogs.

Key words: Babesiosis, Canine, Epidemiology, Jaipur.

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INTRODUCTION

Vector borne diseases (VBD) like babesiosis are receiving more attention by health professionals because recent studies have shown that there are changes in their distribution patterns and prevalence. These changes are attributed to climate and demographic changes, and increase in trade and mobility of animals. Babesiosis can be defined as the infection of the erythrocytes of mammals caused by piroplasms of *babesia* species, which are Apicomplexa protozoa belonging to the suborder Piroplasmidea and the family Babesiidae. The incubation period of canine babesiosis can vary from 10 to 20 days for *B. canis* and 14 to 28 days for *B. gibsoni*. The babesia parasites enter the host through tick bites and invade red blood cells, where they multiply. The infection leads to haemolytic anaemia due to the destruction of red blood cells, resulting in the release of haemoglobin into the bloodstream. This haemolysis can lead to jaundice, haemoglobinuria, and severe anaemia.

The severity of babesiosis depends on the amount of parasite multiplication in the erythrocytes of the host, followed by subsequent cell lysis (Schettters *et al.*, 1997). Other factors, like canine host age and immunity (Brandao *et al.*, 2003) along with concomitant infection or diseases, can also play a role in the potentially variable pathogenicity of canine piroplasms. Babesiosis is diagnosed through clinical signs and symptoms, simple microscopy, *in vitro* culture, animal inoculation, serological tests (CFT, ELISA, and IFAT), and molecular methods such as PCR. Considering the importance of canine babesiosis and the lack of epidemiological data in Jaipur, the aim of this study was to investigate the distribution and prevalence of *Babesia* spp. in the area.

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MATERIALS AND METHODS

The source of animals for the present study was dogs presented to Government Veterinary Polyclinic, Jaipur and Veterinary Clinical Complex, PGIVER, Jaipur, Rajasthan (India) from March to September 2022. Dogs of different age, sex and breed with clinical signs such as high fever above 104°F, inappetence, anaemia, lethargy and a tick infestation history were randomly selected and other clinical signs such as congested/pale/icteric mucous membranes, lymphadenopathy, haematuria, epistaxis, lameness, weakness etc. were recorded. Diagnosis was confirmed with the PCR adopting primers and technique of Singh *et al.* (2014).

RESULTS AND DISCUSSION

Incidence of Babesiosis

The PCR was performed for all the 100 cases, which revealed overall 24% incidence of canine babesiosis. It correlated with the findings of Panda *et al.* (2021) and Gonmei *et al.* (2020),

who detected 19.19% and 28.3% incidence of babesiosis in Bhubaneswar and Mizoram, respectively. Singh *et al.* (2014) and Laha *et al.* (2014) reported 15.42% and 56.75% incidence of babesiosis through PCR assay in Punjab and Assam, respectively. These variations in the incidence of babesiosis could be due to distribution of tick population, immunity of the dogs, season, hygiene and managerial routine.

Age-wise, the incidence was highest in 1-5 years age group (29.16%), followed by < 1 year (25.00%) and > 5 years (16.67%) old dogs. These results correlated with the findings of Singh *et al.* (2014), Kumar *et al.* (2015), and Mahalingaiah *et al.* (2017), while Leica *et al.* (2019), Mahima *et al.* (2020) and Chaurasia *et al.* (2022) found a higher incidence of babesiosis in dogs above 18 months of age. The higher rate of canine babesiosis infection in the age ranges from 1 to 5 years may probably be due to lowered maternal immunity/resistance associated with older dogs as well as frequent exposures to tick bites (Egege *et al.*, 2008; Chaurasia *et al.*, 2022).

Table 1: Age-wise incidence of Babesiosis in dogs

Age (years)	Number of dogs examined (n=100)	No. of positive cases (n=24)	%
< 1 year	16	4	25.00
1-5 years	48	14	29.16
> 5 years	36	6	16.67

In the present study, out of 100 dogs examined 54 were male and 46 were female, out of them, 25.92% (14/54) and 21.73% (10/46) were found positive for babesiosis, respectively. The male showed higher incidence than females, in agreement with the findings of Mahalingaiah *et al.* (2017), Leica *et al.* (2019), Mahima *et al.* (2020), Kunwar *et al.* (2021) and Chaurasia *et al.* (2022). The increased susceptibility of canine babesiosis in males as compared to females can be attributed to the hormonal factors or frequent roaming behaviour of males in search of mates and territory or by sex-linked genetic or hormonal influences on the disease as reported by Tsegay *et al.* (2016) and Chaurasia *et al.* (2022).

Breed-wise, the highest prevalence was recorded in Labrador Retriever (34.78%, 8/23), followed by German shepherd, Non-descriptive, Saint Bernard, Golden Retriever, Pug and others (Table 2). Higher incidence in Labrador retriever was also reported by Bilwal and Mandali (2016) and Mahalingaiah *et al.* (2017). The higher number of Labrador retriever breed dogs presented among the dogs screened during the current study could be the reason for this higher incidence.

Clinical Signs of Babesiosis

Characteristic clinical features observed among 24 positive cases (Table 3) were fever/ pyrexia (95.83%), anorexia (85.50%), history of tick infestation (85.50%), depression and lethargy (79.16%), lymphadenopathy (62.50%), pale mucous membrane (37.50%), congested mucous membrane (33.34%), ocular discharge (29.16%), vomiting (20.83%), diarrhoea (16.67%), haematuria (16.67%) and epistaxis

(16.67%). Neurological signs such as circling and trembling were recorded in 4.17% of cases. Previously, similar findings in canine babesiosis were reported by Solano-Gallego *et al.* (2016), Gonde *et al.* (2017) and Brahma *et al.* (2019).

Table 2: Breed-wise incidence of canine Babesiosis

Breed	No. examined (n=100)	No. of positive cases (n=24)	%
Labrador Retriever	23	8	34.78
German shepherd	18	5	27.78
Non-descriptive	15	4	26.66
Saint Bernard	11	2	18.18
Golden Retriever	11	2	18.18
Pug	6	1	16.66
Rottweiler	6	1	16.66
Pomeranian	8	1	12.50
Dachshund	2	0	0.00

Table 3: Clinical signs recorded in Babesia-infected dogs (n=24)

Clinical signs recorded	No. of animals	%
Pyrexia	23	95.83
Anorexia	21	87.50
Tick infestation	21	87.50
Depression and lethargy	19	79.16
Lymphadenopathy	15	62.50
Pale mucous membrane	9	37.50
Congested mucous membrane	8	33.34
Ocular discharge	7	29.16
Vomiting	5	20.83
Diarrhoea	4	16.67
Epistaxis	4	16.67
Haematuria	4	16.67
Neurological problems (circling, trembling)	1	4.17

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