



International Journal of Veterinary Sciences and Animal Husbandry



ISSN: 2456-2912

VET 2024; SP-9(6): 137-142

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www.veterinarypaper.com

Received: 12-09-2024

Accepted: 16-10-2024

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Studies on the incidence of babesiosis in the YSR District of Andhra Pradesh

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DOI: <https://doi.org/10.22271/veterinary.2024.v9.i6Sc.1885>

Abstract

The present study was aimed to report the prevalence of dogs with babesiosis in Y.S.R district of Andhra Pradesh. Overall prevalence of canine babesiosis was per cent 21.93% (136/620) based on peripheral blood smear microscopic examination. Among 136 positive cases canine babesiosis was found to be higher in dogs be 1-4 years of age and followed by 4-7 years age group. Breed wise prevalence of canine babesiosis was highest in Labrador retriever (37.50%) followed by German Shepherd. The occurrence was higher in males (65.44%) compared to females (34.56%) and the occurrence of canine babesiosis most commonly observed in monsoon season (37.50%), less commonly observed in post-monsoon season (13.24%). More incidence was noticed in male dogs because male dog population was more than female dogs. The higher incidence observed in Labrador Retrievers may be due to the greater concentration of the breed in the locality. Monsoon season noticed higher incidence due to vector population is more and presence of ticks over the body consider as the chances for infection is more likely to occur.

Keywords: Andhra Pradesh, YSR District, incidence, dogs, season, babesiosis

Introduction

Canine babesiosis is a tick-borne disease with worldwide distribution and global significance. Traditionally, babesiosis was diagnosed based on cytological examination of stained blood smears. Babesiosis is a group of tick-borne diseases of both medical and veterinary concerns caused by protozoan parasites of the genus *Babesia* (Dantas Torres *et al.*, 2017) [5]. The clinical manifestations of canine babesiosis vary with different *Babesia* species involved and their specific virulence, and also with factors that determine the host's response to infection such as age, individual immune status, and coinfections with other pathogens (Baneth, 2018) [2]. Babesiosis can cause the development of multi organ disfunction in dogs especially in per acute and chronic disease condition. Recording the incidence of the disease provide the information about the localized disease and variations in the season (Reddy *et al.*, 2016) [18], hence present study carried to report the microscopic incidence of canine babesiosis in YSR district of Andhra Pradesh.

Materials and Methods

During the study period that was carried out at Department of Veterinary Medicine, College of Veterinary Science, Proddatur, veterinary dispensaries and clinics in YSR district of Andhra Pradesh from October 2023 to September 2024. A total of 620 dogs were screened for canine babesiosis. The age, gender, breed, tick infestation and season wise incidence was recorded during present study. Primary screening of dogs was done based on history of dogs with fever, anaemia, lymphadenopathy and tick infestation. Blood smear examination was done making a thin blood smears fixed in methanol and stained with Giemsa solution for 30 minutes (Reddy *et al.*, 2022, Sivajothi *et al.*, 2017) [19, 23]. Oil immersion microscopy for the identification of *Babesia* organisms in the erythrocytes was carried out (Sivajothi *et al.*, 2023) [24].

Results and Discussion

Out of 620 dogs screened, 136 dogs were identified to have canine babesiosis by peripheral blood smear examination. In the present study, dogs were confirmed with babesiosis based on the microscopic examination of the stained peripheral blood smears. The results representing the overall incidence of 21.93 per cent (Table 1 and Figure 1).

The age wise incidence of canine babesiosis was found to be higher occurrence in dogs 1-4 years of age (35.30%) followed by 4-7 years (21.32%), 7-10 years (13.97%), 10-13 (12.50%), 0-1 years (10.29%) and above 13 years (6.62%) of age (Table 2 and Figure 2).

Out of 136 affected dogs, canine babesiosis was more in males 65.44% (89/136) than in female dogs 34.56% (47/136) (Table 3 and figure 3).

The breed wise incidence of canine babesiosis was recorded higher occurrence in Labrador retriever (37.50%) followed by mongrel (14.71%), German shepherd (14.71%), Golden retriever (9.56%), Pomeranian (7.35%), Doberman (5.88%), Shih Tzu (4.42%), Rottweiler (3.67%) and pug (2.20%) (Table 4 and Figure 4).

In the present study, highest incidence of babesiosis was noticed in monsoon period (37.50%) and lowest in post monsoon period (13.24%) (Table 5 and Figure 5).

In the present study, tick infestation seen in most of the dogs with babesiosis about (83.08%) and without tick infestation we were observed babesiosis in (16.92%) (Table 6 and Figure 6).

In India, a variable prevalence of canine babesiosis has been reported. 56% in stray dogs of southern Kerala with *Babesia gibsoni* (Kumar *et al.*, 2021) [10], 21.7% in Assam (Chaudhuri and Varshney, 2007) [3]. (Singh *et al.*, 2012) [22] reported the prevalence *B. gibsoni* and *B. canis* infections (5.45% and 0.37% respectively) in Punjab and (Venugopal *et al.*, 2024) [25] reported the prevalence of *Babesia gibsoni* and *Babesia vogeli* infections (58.33% and 41.67% respectively) in Wayanad district, Kerala.

Hot and humid conditions favour the proliferation of tick population, tick borne diseases like ehrlichiosis and babesiosis are of significant concern in tropical countries like India, as they are transmitted mainly by the brown dog tick, *Rhipicephalus sanguineus* (Shaw *et al.*, 2001) [20]. *Rhipicephalus* is the most common tick present in urban India (Abd Rani *et al.*, 2011) [1].

The incidence of canine babesiosis was 21.93 per cent in the present study which might be due to hot and humid climate favouring the development, survival of tick population and increased urbanisation.

In the present study, incidence of canine babesiosis is mostly seen in 1-4 years age group as compared with other age groups. It might be probably due to a reflection of lowered maternal immunity/resistance associated with older dogs as well as frequent exposures to tick bites (Egege *et al.*, 2008) [6]. Our findings agree with the previous studies of (Hornok *et al.*, 2006) [7] who reported that the canine babesiosis increase with age, reaching its peak between the age of 3 and 5 years and then decline. In certain circumstances incidence of babesiosis in neonates of chronically infected mothers because of degree of immunity to the homologous parasites than those born of normal mothers (Obeta *et al.*, 2009) [14]. Presence of maternal immunity in younger dogs helps them to resist infections with blood parasites (Opara *et al.*, 2017) [17]. However, there are contrary reports from other researchers (Okubanjo *et al.*,

2013) [15], that younger dogs were more susceptible to *Babesia canis* infection than the adult dogs, due to their underdeveloped immune system.

In this present study, male dogs were 65.44% and female dogs were 34.56% was observed. The gender of the animal may have influence in the occurrence of vector borne parasitic diseases. The temperament and hormonal status of male dogs may be a contributory factor as it could limit the attention and care given them even by their owners. Previous reports have shown an increase risk of canine babesiosis for male dogs as compared to female suggesting that the increased susceptibility may be due to differences in environmental exposure, such as increased roaming behaviour, or by sex-linked genetic or hormonal influences on the disease (Mellanby *et al.*, 2011) [13]. The present findings are in agreement with that of Daniel *et al.* (2016) [4], who reported higher rate of *Babesia* infections among male than the female dogs. The reports showed that male dogs were more exposed to tick infestations due to higher tendency to roam about in search of mates and establish territories, than the female counterparts. The present study disagrees with some other studies of (Omodu *et al.*, 2010; Okubanjo *et al.*, 2013; Jegede *et al.*, 2014 and Opara *et al.*, 2017) [16, 15, 8, 17] who reported that the prevalence of hemoprotozoa was higher in the female than male dogs, and reasoned that female dogs may lead to stress and subsequent reduction in their immunity and resistance to tick-borne diseases.

The occurrence of canine *Babesia* infections was significantly higher in Labrador retriever breed as compared with other dog breeds. This pattern is likely because these breeds were predominantly concentrated in the specific regions studied. The findings align with previous research indicating that high-risk breeds, including Labrador Retrievers, Dobermans, Mongrels, and German Shepherds, are among the most affected. For instance, studies in India reported Labradors accounting for 27.69% of cases, followed by Dobermans (16.92%), Mongrels (15.38%), and German Shepherds (12.3%). Researchers attributed these trends to the high population density of these breeds in the studied areas (Latha *et al.*, 2016 and Mahalingaiah *et al.*, 2017) [11, 12].

The occurrence of canine *Babesia* infections was significantly higher in rainy season than in the dry season. The probable reason may be a correlation with the seasonal activity of *Rhipicephalus sanguineus* (brown dog ticks) which is most abundant in wet and humid period of the year, thus resulting to higher transmission rate and thus higher prevalence of *B. canis* infections in the season. In this study we recorded highest in monsoon period between June to September recorded 51 cases (37.50%), summer period between April to June 38 cases (27.94%), winter season between December to April 29 cases (21.32%) and least cases recorded in post monsoon season between October to December 18 cases (13.24%). This result is in agreement with findings of Konto *et al.* (2014) [9], who reported high tick infestations in dogs during the months of wet season than the dry season months. The reason could be due to availability of vegetation cover which provides favourable environment for ticks during rainy season, as ticks are noted to drop off the host to moult and quest on blades and attach on hosts that come in contact with them during grazing or movement (Shitta *et al.*, 2011) [21]. It has also been reported that optimum temperature and high humidity may encourage high fecundity in ticks (Konto *et al.*, 2014) [9].

Table 1: Incidence of *Babesia* infection in dogs

S. No		Number of Dogs	Percentage (%)
1.	Total dogs screened	620	
2.	Dogs with <i>Babesia</i> infection	136	21.93

Table 2: Age wise incidence of *Babesia* infection in dogs

S. No	Age group	Number of dogs affected (136)	Percentage of dogs affected (%)
1.	0-1 years	14	10.29
2.	1-4 years	48	35.30
3.	4-7 years	29	21.32
4.	7-10 years	19	13.97
5.	10-13 years	17	12.50
6.	above 13 years	9	6.62

Table 3: Gender wise incidence of *Babesia* infection in dogs

S. No	Gender	Number of dogs affected (136)	Percentage of dogs affected (%)
1.	Male	89	65.44
2.	Female	47	34.56

Table 4: Breed wise incidence of *Babesia* infection in dogs

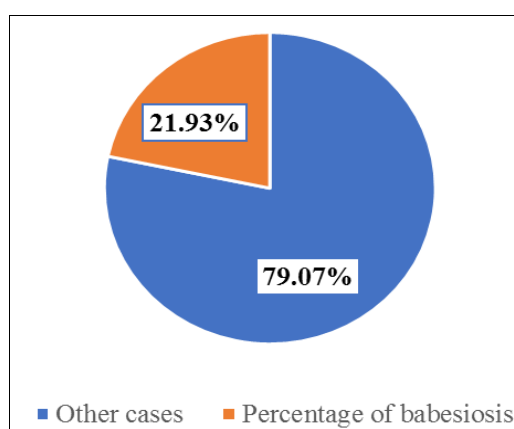
S. No	Name of the breed	Number of dogs affected (136)	Percentage of dogs affected (%)
1.	Labrador retriever	51	(37.50%)
2.	Mongrel	20	(14.71%)
3.	German shepherd	20	(14.71%)
4.	Golden retriever	13	(9.56%)
5.	Pomeranian	10	(7.35%)
6.	Doberman	8	(5.88%)
7.	Shih Tzu	6	(4.42%)
8.	Rottweiler	5	(3.67%)
9.	Pug	3	(2.20%)

Table 5: Season wise incidence of *Babesia* infection in dogs

S. No	Seasons	Number of dogs affected (136)	Percentage of dogs affected (%)
1.	Winter (December-February)	29	21.32
2.	Summer (March - May)	38	27.94
3.	Monsoon (June-September)	51	37.50
4.	Post-monsoon (October-November)	18	13.24

Table 6: Incidence of *Babesia* infection in dogs based on the tick infestations

S. No	Tick infestation	Number of dogs affected (136)	Percentage of dogs affected (%)
1.	Present	113	83.08
2.	Absent	23	16.92

**Fig 1:** Incidence of *Babesia* infection in dogs

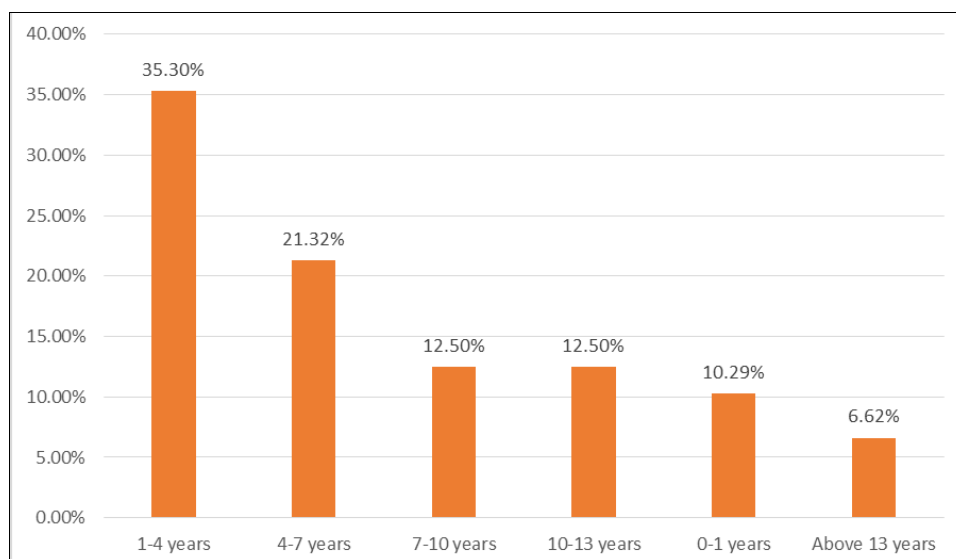


Fig 2: Age wise incidence of *Babesia* infection in dogs.

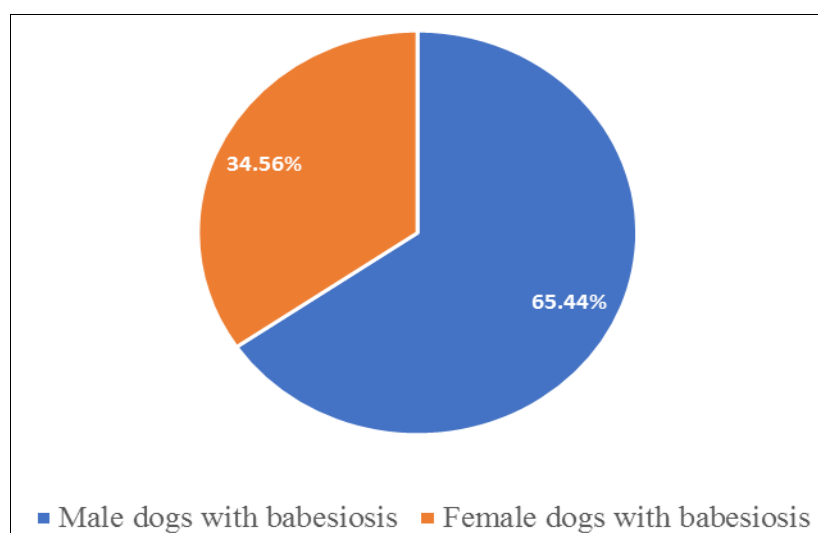


Fig 3: Gender wise incidence of babesiosis in dogs

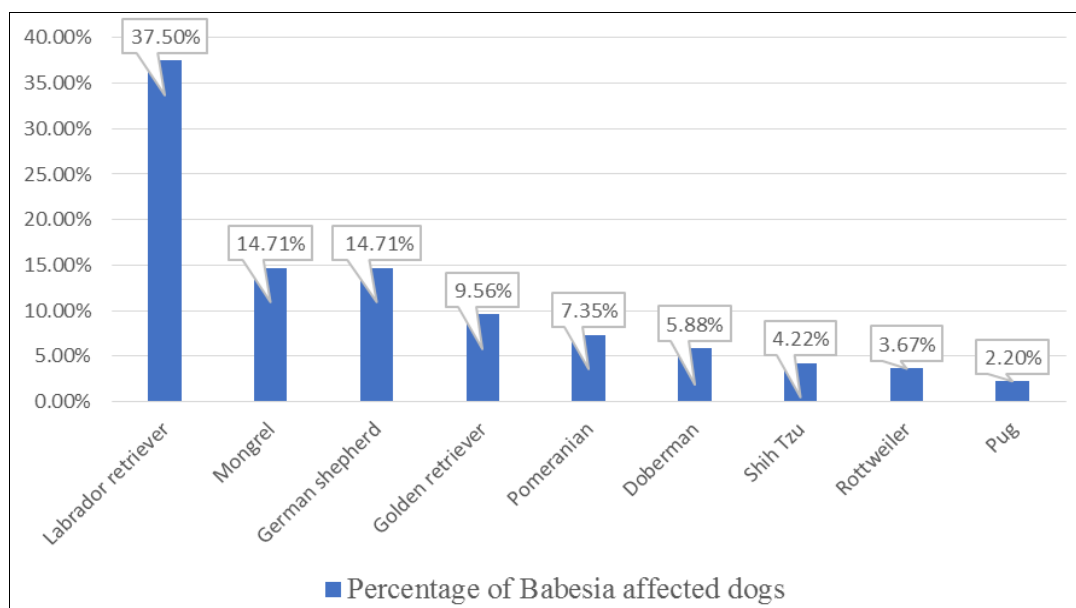


Fig 4: Incidence of babesiosis in various breeds of dogs.

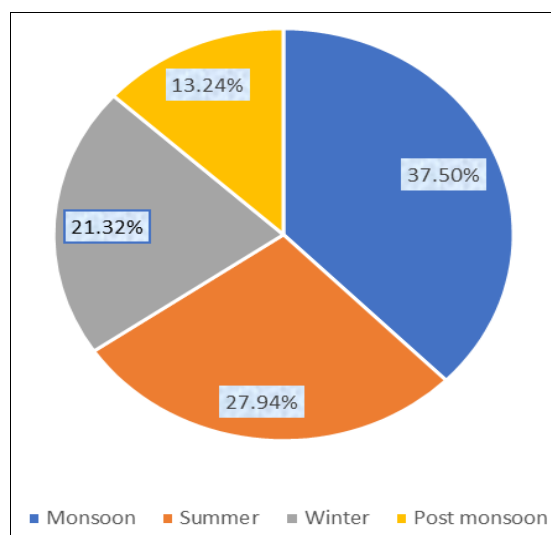


Fig 5: Season wise incidence of babesiosis in dogs

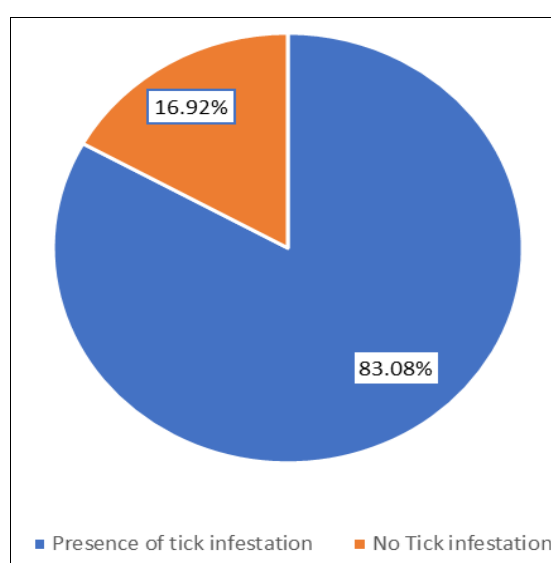


Fig 6: Incidence of *Babesia* infection based on the tick infestation.

Conclusion

In the present study, dogs with clinical signs suspected for haemoprotozoan diseases were screened and 21.93% were positive for babesiosis which indicative of presence of high rate of incidence. It is depended on the vector population and favourable compatible climate of population of vectors in the study region.

Conflict of Interest

Not available

Financial Support

Not available

6. References

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How to Cite This Article

Nagarjuna G, Reddy BS, Saritha G, Sivajothi S. Studies on the incidence of babesiosis in dogs in the YSR District of Andhra Pradesh. *International Journal of Veterinary Sciences and Animal Husbandry*. 2024;SP-9(6):137-142.

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