Escalations in the incidence of canine babesiosis over a period of 8 years (2006–2013) in Chennai, Tamil Nadu, India

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Abstract Epidemiological studies on the incidence and prevalence of disease will help in the monitoring and surveillance of diseases thus preventing occurrence of an epidemic. This study focuses on the variations in the incidences of canine babesiosis over a period of 8 years in Chennai. Variations have been noticed to in the incidence of the species of *Babesia* affecting dogs. There has been an escalation in the incidence of *B.gibsoni* infection during the study period. The factors such as seasonal, age, sex and breed influences on the incidence have been studied.

Keywords Canine babesiosis · *Babesia canis* · *Babesia gibsoni* · Incidence

Introduction

Babesiosis in a hemoprotozoan parasitic disease affecting cattle, dogs, sheep, goats, horses, wild canids and bovids. The common etiological agents of babesiosis in dogs are *Babesia canis* (large form) and *B.gibsoni* (small form). The disease is known to be transmitted by acarine vectors. Dogs also acquire the infection from dog bites, blood transfusions, or transplacental transmission. Babesiosis is char-

acterized by pyrexia, haemolytic anaemia, jaundice, lethargy and hemoglobinuria. Though both the species of *Babesia* affect dogs normally, certain variations in their incidence and prevalence pattern has been noticed in the recent years.

The ever changing global scenario of climate change, global warming etc., has not only posed a challenge for the survival of animals and human beings but also has influenced the pathogens affecting them. Thus in recent years, the reports on emergence and re-emergence of diseases are increasing. Therefore, monitoring and surveillance of diseases are essential to have a check on the incidences of these diseases. Epidemiological studies on the incidence and prevalence pattern are gaining importance due to this aspect. This paper presents the variations in the incidences of the Babesiosis in dogs in Chennai, Tamilnadu, India.

Materials and methods

A total of 28,343 blood smears collected during the eight year period spanning from January 2006–December 2013 from dogs brought to Madras Veterinary College Teaching Hospital form the basis of the study. Peripheral blood smears were collected from dogs exhibiting clinical signs such as pyrexia coupled with haemoglobinuria, lymphadenopathy, lethargy and tick infestation. The smears were stained with Leishman–Giemsa cocktail staining technique and examined for the presence of hemoprotozoan parasites. The smears were screened and the organisms were identified by their based on their morphology. *B.canis* organisms were large, bilobed and occurred in pairs while *B.gibsoni* were small, oval or ring shaped organisms in red blood cells.

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Fig. 1 Incidence of Babesiosis in dogs **Fig. 2** Sex-wise incidence of *B. gibsoni* **Fig. 3** Sex-wise incidence of *B. canis*

Fig. 4 Age-wise incidence of *Babesia gibsoni* **Fig. 5** Age-wise incidence of *Babesia canis* **Table 1** Breed-wise incidence of Babesiosis (in percent)

Breed of dog	<i>Babesia gibsoni</i>	<i>Babesia canis</i>
Spitz	23	16
Labrador	27	25
Non-descript	18	19
German Shepherd	12	9
Doberman	8.8	7
Lhasa Apso	1.8	4
Dalmatian	5	4
Boxer	3	3
Other breeds affected	Great Dane, Daschund, Rottweiler, Cocker Spaniel, Golden Retriever	Pugs, Daschund, Great Dane

Results and discussion

Of the 28,343 blood smears that were screened for various hemoprotozoan diseases, 1169 (4.12 percent) were positive for *B.gibsoni* and 119 (0.0042 percent) were positive for *B. canis*. The number of cases that were screened increased from 1404 in 2006 to 7432 in 2013. There was an escalation in the incidence of *B.gibsoni* infection in dogs from 22 percent in 2006 to 84 percent in 2007 and thereafter a

steady decline to the lowest of 6.88 percent in 2013. However, the incidence of *B. canis* has ranged between 2 and 6 percent with the year 2011 alone recording highest incidence of 8.5 percent. The percent incidence of babesiosis from 2006 to 2013 has been depicted in Fig. 1. Re-emergence of *B.gibsoni* in dogs at Chennai has been reported in 2002 (Harikrishnan et al. 2002) and since then *B.gibsoni* is encountered regularly. Similar findings have also been documented by Birkenheuer et al. (2005) in USA, where an increased incidence of *B.gibsoni* was recorded as against *B.canis vogeli*. This is in contrast to a report by Sundar et al. (2004) which revealed just 0.08 % incidence of *B. gibsoni* in Chennai.

Sex-wise incidence of *B. gibsoni* and *B. canis* infections in dogs has been depicted in Figs. 2 and 3, respectively. It could be inferred that *B. gibsoni* infection was recorded equally in both male and female dogs. This finding was in concurrence with that reported by Senthil Kumar et al. (2009). However, with *B. canis*, certain sex related differences have been noticed. In 2006, all the cases of *B. canis* was recorded only in male animals and preponderance of infection among males have been recorded in 2009, 2010, 2012 and 2013.

Observations on the age-wise incidence of Babesiosis (Figs. 4, 5) indicated that the young dogs less than 1 year of age and adult dogs above 6 years were more infected. This could be attributed to the fact the poor immune status

Fig. 6 Month-wise incidence of Babesiosis in dogs

in young as well as adult dogs. This finding is similar to that recorded previously by Senthil Kumar et al. (2009) and Samad (2008). Breed-wise observations (Table 1) indicated that the Spitz, Labrador, Non-descript and German shepherd are the mostly affected breeds with both the species of *Babesia*. It has been pointed out by Senthil Kumar et al. (2009) that Spitz and non-descript animals were most affected with hemoprotozoan diseases than the other breeds attributing incidence to the hairy nature of the former making it more conducive for the vector survival while they attributed poor management of the latter as the reason for higher incidence.

Analysis of the season-wise (Fig. 6) of babesiosis revealed peak infection during November (Monsoon) and another peak in April (beginning of summer). During winter (December–March), the incidence was common. This could be attributed to the temperature and relative humidity variations which favour the vector survival and

hence the transmission. This finding also concurs with that recorded by Senthil Kumar et al. (2009).

References

- Birkenheuer AJ, Correa MT, Levy MG, Breitschwerdt EB (2005) Geographic distribution of babesiosis among dogs in the United States and association with dog bites: 150 cases (2000–2003). *J Am Vet Med Assoc* 227(6):942–947
- Harikrishnan TJ, Pazhanivel N, Thirunavukkarasu PS (2002) A note on the incidence of *Babesia gibsoni* in a dog from Chennai. *Cheiron* 31:3–4
- Samad MA (2008) *Animal husbandry and veterinary science*, vol 2. BAU Campus, Mymensingh
- Senthil Kumar K, Vairamuthu S, Kathiresan D (2009) Prevalence of hemoprotozoans in canines in Chennai city. *Tamilnadu J Vet Anim Sci* 5(3):104–108
- Sundar N, Balachandran C, Senthilvelan A (2004) Incidence of *Babesia gibsoni* infection in dogs in Tamil Nadu. *J Vet Parasitol* 18:69–70