

Research Article

INCIDENCE OF CANINE BABESIOSIS IN AND AROUND KOLKATA, WEST BENGAL, INDIA

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ABSTRACT: A total of 226 numbers of dogs (114 male and 112 female) in and around Kolkata were screened during November 2012 to July 2013 for Babesiosis and out of them 72 animals (31.86%) were found clinically and cytologically positive with higher incidence in female dogs (53.33%) than male (46.68%). Out of 72 positive samples 68 and 4 animals were found infected with small and large form of *Babesia* spp., respectively. The present study revealed that incidence of Babesiosis according to sex ratio (male: female) was 1: 1.4. Seasonal record indicated that incidence of *Babesia* was higher in the months of May and June (7.07%) and less in the month of January (0.44%).

Key word: *Babesia* spp., Dog, Kolkata.

INTRODUCTION

Canine babesiosis is a tick borne hemoprotozoan disease of domestic dog in tropical and sub-tropical region of the world, with important medical, veterinary and agricultural impacts. Two main infective agents of the disease are intra-erythrocytic *Babesia canis* and *Babesia gibsoni*. The clinical signs exhibit subclinical, per-acute, acute or chronic forms (Breitschwerdt 1984) with a wide range of inconsistent clinical manifestations. Victor Babes first recognized *Babesia* in the red blood cells of cattle in 1888. *Babesia* spp. is transmitted by Ixodid ticks, first described by Smith and Kilborne (1893). Historically, this was insignificant advances in the field of parasitology, because it was the first proof of

concept that an arthropod could serve as a vector of disease (Levine 1973).

The prevalence of tick-borne haemoprotozoan diseases in India is quite high because of favourable climatic conditions. Scanty information is available on the occurrence of these vector-borne haemoprotozoan pathogens in India. In the South India, particularly Tamil Nadu, *Babesia canis* (Harikrishnan *et al.*, 2002) and in North India, particularly U.P., *B. gibsoni* (Varshney *et al.*, 2004) have been reported as predominant infection. In Assam (Saud and Hazarika 2000) 45.45% cases of babesiosis have been reported in the month of June). While Vershney *et al.* (2003) observed that cases of babesiosis were scattered throughout the year but 60% of these

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were observed during March to June in an analysis of 100 natural cases of canine babesiosis. Nevertheless, large sample size studies over a considerable extended period of time on canine babesiosis are lacking in India.

MATERIALS AND METHODS

The entire work involved in the study was carried out in the Department of Veterinary Parasitology, West Bengal University of Animal and Fishery Sciences, Kolkata. The study was conducted for a continuous period of nine months during November 2012 to July 2013. Canine samples were collected from Dog ward of WBUAFS and Veterinary clinics in and around Kolkata. Ailing dogs with history of tick infestation, erratic fever prolong illness unresponsiveness to routine treatment were evaluated and those found positive for *Babesia* infection in blood smear were included in this study. Thin blood smears of all blood samples were prepared on two microscope slides by placing a drop of blood on grease free slide and stained by Giemsa stain as per the standard method by Hendrix (1998) with some modifications and examined under microscope.

RESULTS AND DISCUSSION

During the study period, blood samples from a total of 226 ailing dogs (114 male dogs and 112 female dogs) were examined for presence of *Babesia* spp., out of which, 72 samples (31.86%) were found clinically and cytologically positive for the haemoprotozoa and the rest 166 blood samples were found negative.

Babesia spp. was diagnosed by standard morphological features based on microscopic examination of 72 positive blood smears. Cytological studies revealed four large forms

Table 1: Sex-wise incidence of Babesiosis in dogs.

Sex	Number of positive cases	percentage
Male	30	46.66
Female	42	53.33
Sex ratio (M/F)	1 : 1.4	

Babesia spp. within the red blood cells and these were of lightly basophilic pyriform structures with indistinct internal structures in Giemsa stain. The large forms were typically seen as 2.4 x 5 µm sized bodies (Fig. 1).

Of the positive cases 68 numbers were small pleomorphic form of *Babesia* spp. without pyriform shape present in the centre and typically found in the peripheral portion of blood smears. Identifying these parasite through blood smear evaluation was very difficult because small size of the organism and relatively low levels of parasitemia. These were approximately 1 x 2.5 µm in size and had a signet, rod, or cocci shape (Fig. 2). A single organism per RBC was common but multiple forms were also observed.

Female showed a slightly higher level of infections compared to male. Among the male dogs screened 30 (46.66%) dogs were found positive for the *Babesia* spp. and the rest 84 were found negative, whereas, in case of female 42 (53.33%) were found positive while 70 were found negative for the presence of piroplasm. The overall sex ratio of incidence was (male/female) 1:1.4. (Table 1).

Canine babesiosis was detected over entire study period of nine months. The percentage of the positive cases starting from November, 2012 to July, 2013 was 2.65%, 0.88%, 0.44%,

Table 2: Month-wise incidence of canine babesiosis.

Month	No. of samples examined			No. of Positive samples.			Incidence (%)
	Total	Male	Female	Total	Male	Female	
November, 2012	12	6	6	6	2	4	2.65
December, 2012	25	15	10	2	0	2	0.88
January, 2013	13	7	6	1	0	1	0.44
February, 2013	23	11	12	5	2	3	2.21
March, 2013	10	5	5	5	3	2	2.21
April, 2013	30	16	14	10	5	5	4.42
May, 2013	44	20	24	16	6	10	7.07
June, 2013	37	18	19	16	7	9	7.07
July, 2013	32	16	16	11	5	6	4.86
Total	226	114	112	72	30	42	31.88

2.21%, 2.21%, 4.42%, 7.07%, 7.07%, 4.86%, respectively. The highest numbers of positive cases were recorded both in May and June (7.07%) and lowest in January (0.44%) (Table2).

Microscopic examination remains the simplest and most accessible diagnostic test and during acute infections microscopy is reasonably sensitive for detecting intra erythrocytic parasites in Giemsa or Wright's stained blood smears. Differentiation between large and small piroplasms is also relatively simple. Moreover, microscopy is still the only viable option available in many parts of the developing world where babesiosis is endemic (Böhm *et al.*, 2006). For large *Babesia* species at least, blood sampling from capillary beds (ear tip, toe nail) or examination of cells from beneath the buffy coat of a haematocrit tube may improve the probability of finding parasites (Irwin 2009). The smaller parasite, *B. gibsoni* occurs mainly in the Middle East, South Asia,

Japan, North Africa, and South America and is an emerging infectious disease in USA, as well as having been detected lately in Italy, Hungary and Australia (Muhlnickel *et al.*, 2002, Schoeman 2009). *B. gibsoni* accounted for 94.44% (68/72) case of babesiosis diagnosed in the present study. Present investigation clearly indicated that pleomorphic small *B.gibsoni* was the predominant *Babesia* species in this region in agreement with earlier observation (Mitra *et al.*, 1987). In another study, Selvaraj *et al.* (2010) also recorded 69% canine babesiosisinfection by *B. gibsoni*.

Canine babesiosis was diagnosed in all the months in Dog ward of WBUAFS and Veterinary clinics in and around Kolkata on basis of cytological examinations of the blood smears. During the period of 9 month from November 2012 to July 2013, 72 cases were found cytologically positive for *Babesia* infection making the incidence rate of canine babesiosis 31.86% in dogs. The occurrence of

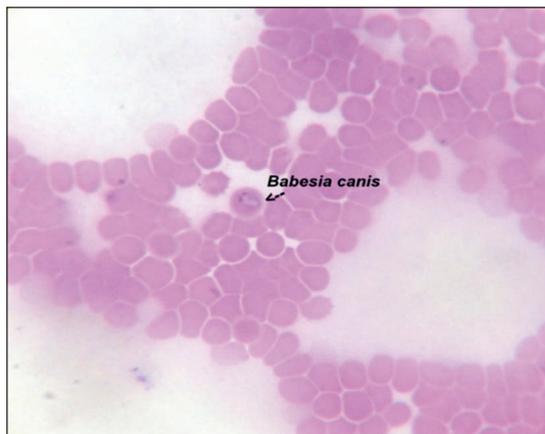


Fig.1 : Blood smear of dog showing infection of large form canine *Babesia* spp. Geimsa stained.

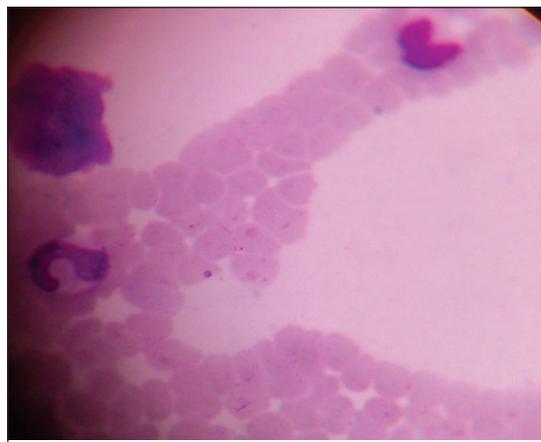


Fig.2 : Blood smear of dog showing infection of Small form canine *Babesia* spp. Geimsa stained.

babesiosis in this study was in accordance with the finding of Samradhni *et al.* (2005) who reported an incidence of 64% amongst the haemoprotozoal infections in dogs. In other studies Varshney and Dey (1998) observed a very low (0.066%) rate but Chaudhuri (2006) recorded 8.90% prevalence of canine Babesiosis at referral canine poly clinic, Indian Veterinary Research Institute, Uttar Pradesh. In Assam, Saud and Hazarika (2000) found that 21.68% of dogs examined in a year were positive for *Babesia* infection without detailed identification of *Babesia* spp. involved in infection. Selvaraj *et al.* (2010) also recorded an incidence rate of 8.96% in Chennai.

The present study revealed that the percentage of canine babesiosis was higher in summer as compared to other seasons. As this disease is spread by ticks prevalence of which is also high during summer. The incidence of babesiosis in summer season was 19.02% followed by in spring (13.71%) and winter (3%). In summer months, higher incidence of canine babesiosis might be due to high ambient temperature and humidity which seem to be

more conducive for sustenance of tick vectors *Rhipicephalus sanguineus* (Bansal *et al.*, 1985). Similar findings were recorded by Lorusso *et al.* (2010) who recorded the largest population of ticks in months of August, September, January and July. The present observation of higher incidence during hot humid weather condition is in full agreement with the earlier observation of Saud and Hazarika (2000), Varshney *et al.* (2003), Chaudhuri (2006), Jacobson (2006), Senthil Kumar *et al.* (2009) and Ahmad *et al.* (2011). In a small scale study, Varseny and Dey (1998) reported prevalence of *B. gibsoni* infection @ 0.66% of referral canine polyclinic in Bareilly, Uttar Pradesh. They further observed that *B. gibsoni* was more prevalent (15 out of 18) as compared to *B. canis* (16.67%) infection.

The present study indicated that female dogs were more prone to babesiosis than male dog and this did not agree with the finding of Taboda *et al.* (1992), Chowdhury (2006) and Jefferies *et al.* (2007). Bitch was mostly predisposed for their hormonal status that may lead to higher level of infection (Mellanby *et al.*, 2011).

REFERENCES

- Ahmad SS, Khan MS, Khan MA (2011) Epidemiology and seasonal abundance of canine babesiosis in Lahore, Pakistan. *J Anim Plant Scs* 21(2 suppl): 351-353.
- Bansal SR, Gautam OP, Banerjee DP (1985) Prevalence of *Babesia canis* and *Hepatozoancanis* infection in dogs of Hissar (Haryana) and Delhi and attempts to isolate *Babesia* from Human Beings. *Ind Vet J* 62:748-751.
- Böhm M, Leisewitz AL, Thompson PN, Schoeman JP (2006) Capillary and venous *Babesia canisrossi* parasitaemias and their association with outcome of infection and circulatory compromise. *Vet Parasitol* 141:18-29.
- Breitschwerdt EB (1984) Babesiosis. In *Clinical Microbiology and Infectious Diseases of the Dog and Cat* (Edited by Greene CE). 796 - 805.
- Chaudhary S (2006) Studies on clinic-therapeutic aspects of babesiosis in dogs. M.V.Sc thesis submitted to IVRI. Deemed University, Izatnagar, BareillyUttar Pradesh, India.
- Harikrishnan TJ, Pazhanivel N, Thirunavukkarasu PS (2002) A note on incidence of *Babesia gibsoni* in dog. *Cheiron* 31:102.
- Hendrix CM (1998) *Diagnostic Veterinary Parasitology*. 2nd edition. Mosby Inc. St. Louis Missouri.
- Irwin PJ (2009) Canine babesiosis. From molecular taxonomy to control. *Parasite Vector* 2 (suppl) : 1-9.
- Jacobson LS (2006) The South African form of severe and complicated canine babesiosis. *Vet Parasitol* 138: 126-139.
- Jefferies R, Ryan U, Irwin PJ (2007) PCR-RFLP for the detection and differentiation of the canine piroplasm species and its use with filter paper-based technologies. *Vet Parasitol* 144: 20-27.
- Levine ND (1973) *Protozoan Parasites of Domestic Animals and Man*. Burgess Publishing Company, Minneapolis, MN. 406
- Lorusso VF, Dantas-Torres RP, Lia VD, Tarallo N, Mencke G, Capelli, Otranto D (2010) Seasonal dynamics of the brown dog tick, *Rhipicephalus sanguineus*, on a confined dog population in Italy. *Med Vet Entomol* 24(3) : 309-15.
- Mellanby RJ, Handel IG, Clements DN, Bronsvort BMde C, Lengeling A, Schoeman JP (2011) Breed and Sex Risk Factors for Canine Babesiosis in South Africa. *J Vet Intern Med* 25(5):1186-1189.
- Mitra K, Ghosh P, Chattopadhyaya AP, Chowdhury CSP (1987) Canine babesiosis. *Indian J Anm Hlth* 26: 85.
- Muhlnickel CJ, Jefferies R, Ryan U, Irwin PJ (2002) *Babesia gibsoni* infection in three dogs in Victoria. *Aust Vet J* 80 : 606-610.
- Samradhni D, Maske DK, Shobha R, Shinde PN (2005) *Indian J Anim Hlth* 44 (1) : 57-66.
- Saud N, Hazarika GC (2000) Studies on the incidence and biochemical changes of *Babesia* infection in dogs. *Indian Vet J* 77: 944-947.
- Schoeman JP (2009) Canine babesiosis. *Ondersteport J Vet Res* 76: 59-66.
- Selvaraj P, Senthil Kumar K, Vairamuthu S, Prathaban P, Srinivasan S (2010). *Tamiladu J Vet Anim Scs* 6(3) : 122-124.

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SenthilKumar K, Vairamuthu S, Kathresa D (2009) Prevalence of Haemoprotozoans in canines in Chennai city. *Tamiladu J Vet Anim Scs* 5(3):104-108.

Smith T, Kilbourne EL (1893) Investigation into the nature, causation, and prevention of southern cattle fever. *US Dept Agr Bur Anim Indust Bull* 1: 1-301.

Taboada J, Harvey JW, Levy MG, Breitschwerdt EB (1992) Seroprevalence of babesiosis in Greyhounds in Florida. *J Am Vet Med Assoc* 200: 47-50.

Varshney JP, Dey S (1998) A clinical study on haemoproto-zoan infections in referral canines. *J Remount Vet Crop* 37: 83–89.

Varshney JP, Kumar A Hoque M (2004) *Ehrlichia platys* and *Babesia canis* infection in dog: A clinical report. *J Vet Parasitol* 18: 35-43.

Varshney JP, Varshney VP Hoque M (2003) Clinico-haematological, biochemical endocrinological and ultrasonographic findings in canine babesiosis. *Indian J Anim Sci* 73: 1099–1101.

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