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

M.K. Das, S. Baidya*, A. Mahato, S. Pandit, J.D. Ghosh, S. Chaudhuri#, M.Das

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 an 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...
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 prolonged 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 *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 × 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 × 2.5 μm in size and had a signet, rod, or coccid 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).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number of positive cases</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30</td>
<td>46.66</td>
</tr>
<tr>
<td>Female</td>
<td>42</td>
<td>53.33</td>
</tr>
<tr>
<td>Sex ratio (M/F)</td>
<td></td>
<td>1 : 1.4</td>
</tr>
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</table>

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%,
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 intraerythrocytic 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

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


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