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Prevalence of haemoprotozoan infections in dogs in Chennai

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Abstract

The present work was carried out to assess the prevalence of haemoprotozoan infections in dogs presented at Madras Veterinary College Teaching Hospital, Chennai. A total of 6415 blood smears from various dog breeds showing clinical signs of haemoprotozoan infections were referred for this laboratory for confirmative diagnosis. The overall prevalence of haemoprotozoan infections was found to be 1.09%, of which, *E. canis* recorded the highest prevalence (87.14%), followed by *H. canis* (10.00%) and *Trypanosoma* spp and *Babesia vogeli* (1.42% each). The females revealed highest percentage of 60% compared to the males (40%). With regard to the age, the highest prevalence was recorded in dogs belonging to 0-3 years (55.71%), followed by 4-6 years (25.74%) and more than 6 years (18.57%). Among breeds, non-descript breeds revealed the highest prevalence (34.28%) followed by Labrador Retriever (27.14%), Spitz (14.28%), German Shepherd and Doberman (5.71% each), Dachshund and Pug (4.28% each) and Boxer, Great Dane and St. Bernard (1.42% each).

Keywords: Chennai, dog, haemoprotozoan, prevalence

Introduction

Like humans, dogs are also susceptible to both infectious as well as non-infectious diseases worldwide. Among various infectious diseases, hemoprotozoan diseases namely ehrlichiosis, babesiosis, trypanosomiasis, and hepatozoonosis are frequently documented in dogs from tropical countries like India (Bhagwan *et al.*, 2024) [2]. Most protozoan infections are transmitted by vectors like ticks and mosquitoes, of which the former is considered the second most prevalent hematophagous parasite next to the latter. Among various haemoprotozoan infections, ehrlichiosis caused by the obligatory intracellular pleomorphic rickettsia, *Ehrlichia canis* is deemed to be of global importance in dogs posing a major threat to the pet practitioners, characterized by thrombocytopenia which in turn results in variable haemorrhagic lesions from petechiae to ecchymoses (Aziz *et al.*, 2022; Senthil and Chakravarthi, 2023) [1, 11]. Babesiosis which is a common tick-borne disease affecting dogs worldwide is caused by various species of *Babesia* including *B. vogeli*, *B. gibsoni*, etc. Clinical signs are generally attributed to the hemolysis caused by the organisms invading the erythrocytes and resulting in haemolytic anemia which is a hallmark of this protozoan infection (Köster *et al.*, 2015) [7]. Trypanosomiasis in dogs, transmitted mechanically by biting flies particularly *Tabanus* and *Stomoxys* species is characterized by clinical signs namely anaemia, anorexia, intermittent fever, generalized weakness, conjunctivitis, corneal opacity, oedema, dysphagia and staggering gait (Prasad *et al.*, 2015) [9]. Hepatozoonosis is another widespread tick-borne protozoan infection affecting dogs with varying clinical signs ranging from subclinical to severe signs. Non-specific signs namely lethargy, anorexia, weight loss, lymphadenopathy, and fever are the predominant findings, while life-threatening conditions may occur in dogs with concomitant infections with other infectious agents like *Ehrlichia* spp, *Babesia* spp etc, and also in immunocompromised animals and puppies. Babesiosis, Trypanosomiasis, Leishmaniosis, and Hepatozoans are mainly transmitted through vectors like ticks, mites, lice, triatomines, mosquitoes, tabanids, and sand flies and produce vector-borne

diseases (CVBD), in tropical and subtropical countries including India (Bhattacharjee and Sarmah, 2013) [3]. Confirmative diagnosis is usually done by demonstrating these haemoparasites in the blood through either microscopic examination or molecular methods such as PCR (De Bonis *et al.*, 2021) [4].

Materials and Methods

A total number of 6415 blood smears prepared from various breeds of dogs presented at Madras Veterinary College Teaching Hospital, Chennai were referred to the Centralised Clinical Laboratory, Madras Veterinary College, Chennai for the presence of various haemoprotozoan parasites with a history of anorexia, epistaxis, vomiting, melena, corneal opacity, lymph node enlargement, pale mucous membrane and ecchymoses on various parts of the body. The present study was conducted for a period of four months (July 2024–November 2024). The blood smears were air dried, stained with Leishman and Giemsa cocktail stain as described by Garbayl *et al.* (2006) [5], and subjected to microscopic examination for the presence of haemoparasites.

Results and Discussion

Out of 6415 blood smears examined, 70 samples were found to be positive for various hemoprotozoan infections, thus revealing an overall prevalence of 1.09%. Of 70 positive cases recorded, *Ehrlichia* spp was found in 61 cases (87.14%), *H. canis* in 7 cases (10.00%) while *Trypanosoma* spp and *Babesia vogeli* were observed in an isolated case (1.42%) each. Thus *E. canis* recorded the highest prevalence, followed by *H. canis*, *Trypanosoma* spp, and *Babesia vogeli*. Sex-wise prevalence revealed that females accounted for 42 cases (60%) while males for 28 cases (40%) and thus females demonstrated a higher prevalence than males. Age-wise study showed that dogs belonging to 0-3 years revealed positive for 40 cases (55.71%), 4-6 years revealed 18 cases (25.74%) while more than 6 years recorded 13 cases (18.57%) and thus showing highest prevalence in dogs belonging to 0-3 years, followed by 4-6 years and 6-9 years. Among different breeds affected, infected cases were observed in 24 non-descript breeds (34.28%), 19 Labrador (27.14%), 10 Spitz (14.28%), four German Shepherd and Doberman (5.71% each), three Daschund and pug (4.28% each) and a Boxer, Great Dane and St. Benaurd (1.42% each) and thus revealing highest prevalence in non-descript breed, followed by Labrador Retriever, Spitz, German Shepherd and Doberman, Dachshund and Pug and Boxer, Great Dane and St. Benard.

The prevalence of 1.09% hemoprotozoan infections recorded during the present study was also observed by Mehta *et al.* (2020) [8] who reported an overall prevalence of 2.48% in 3500 dogs examined for various hemoprotozoan diseases. In contrast to these findings, Senthilkumar *et al.* (2009) [9], Jalmi *et al.* (2010) [6] and Sahu *et al.* (2014) [10] reported an increased prevalence of 11.57%, 12.6% and 10.54% respectively. The low prevalence of haemoprotozoan infections recorded in the present study could be attributed to the control of ectoparasites and the indiscriminate use of antibiotics by the practitioners without any confirmative diagnosis.

The present findings of an increased prevalence of ehrlichiosis in dogs were in accordance with that of Mehta *et al.* (2020) [8] and Senthil and Chakravarthi (2023) [11] who also observed an increased prevalence in dogs examined for various hemoprotozoan diseases. In contrast to these findings, Jalmi *et al.* (2010) [6] recorded an increased prevalence of

babesiosis (8%) followed by ehrlichiosis (6%) and *Haemobartonella* infections (0.6%). The increased prevalence of ehrlichiosis in the present study might be attributed to the widespread presence of a vector namely *Rhipicephalus sanguineus* which is responsible for transmission of this disease in these regions.

A higher incidence of haemoprotozoan infections in females observed during the present study was also reported by Vonkur *et al.* (2022) [13] who also reported an increased prevalence in females. In contrast to these findings, Sahu *et al.* (2014) [10] and Mehta *et al.* (2020) [8] recorded an increased prevalence in males. The higher incidence documented in females during the present study might be due to the influence of sexual hormones and also stress and altered immune function during pregnancy and lactation which in turn makes them more prone to parasitic infections when compared to males.

The present findings revealed an increased prevalence in dogs belonging to 0-3 years, followed by 4-6 years and more than 6 years. Similarly, Sahu *et al.* (2014) [10] recorded a higher incidence in dogs aged less than one year than dogs that were more than one year. Senthil and Chakravarthi (2023) [11] documented a maximum number of cases in the age group of 2-6 years followed by 0-2 years, 6-10 years and above 10 years. Mehta *et al.* (2020) [8] observed an increased prevalence in dogs aged above 18 months followed by dogs between 7 to 18 months and 0-6 months. The cause of increased prevalence in young dogs recorded during the present study might be due to increased activity of bone marrow which in turn results in more active precursor cells in young dogs, thus providing an opportunity for the haemoparasites to infect more cells and multiply rapidly.

The findings of an increased prevalence in non-descript breeds followed by Labrador Retriever, Spitz, German Shepherd and Doberman, Dachshund, Pug, Boxer, Great Dane and St. Bernard during the present study correlates well with that of Senthil and Chakravarthi (2023) [11] who also reported highest prevalence in non-descript dogs followed by Labrador Retriever, Spitz, German Shepherd and others. The cause of the increased incidence of hemoprotozoan infections in non-descript breeds in the present study might be attributed to the potential lack of genetic resistance of these breeds to the hemoparasites in combination with other environmental and weakened immune systems when compared to the pure breeds which are selectively bred with potential genetic traits for resisting these haemoprotozoan parasites.

Conclusion

An overall prevalence of haemoprotozoan infections in Chennai was found to be 1.09%, of which, *E. canis* recorded the highest prevalence, followed by *H. canis* and *Trypanosoma* spp and *Babesia vogeli*. The females showed highest percentage of susceptibility in comparison to males. Young dogs belonging the age group of 0-3 years were found to be more susceptible than the adults. Non-descript breeds showed a higher prevalence than other pure breeds. The lower incidence of haemoprotozoan disease in the study could be due to the adoption of tick control management and good management practices followed by the pet owners.

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