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## Tick borne haematozoan diseases among dogs of Chennai metropolitan area and status of ehrlichiosis associated anemia, thrombocytopenia & pancytopenia: 2020-21 study

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### Abstract

Tick borne diseases and their complications in dogs are increasing over the years. Periodical assessments helps in planning to handle such health care burdens. Medical records of the clinical cases presented to the Small Animal Medicine Referral Clinics and Emergency Critical Care Medicine Referral Clinic of Madras Veterinary College, Chennai, were analyzed. Among the TBD cases of 268 identified in this study, 120 cases were ehrlichiosis affected dogs (44.77%) and remained one among the highly prevalent disease in Chennai Metropolitan Area. 66 cases (24.62%) were found to be affected by *Babesia canis* and 59 cases (22.01%) were found to be affected by *Babesia gibsoni*. Together babesiosis affected dogs were 46.63%, which is little higher than the *E.canis* affections. 23 dogs (8.58%) were found to be affected with *H.canis*. Incidence of TBD, status of anemia, thrombocytopenia and pancytopenia due to *E.canis* were evaluated in this study.

**Keywords:** Haematozoan diseases, *Babesia gibsoni*, *E.canis*, *H.canis*

### Introduction

Tick borne diseases (TBD) remain a day today challenge for the practicing veterinarians, especially in the Indian scenario. Ehrlichiosis is one among the commonest TBD encountered in every day practice. Unfortunately the nature and severity of complications in Ehrlichiosis is unpredictable and hence unmanageable. These also possess diagnostic, monitoring and therapeutic challenges. Many a times, anemia and thrombocytopenia complicates the outcomes. The need for blood and blood products keep increasing due to increasing prevalence of TBDs and puts enormous strains on the veterinary service providers operating in both governmental and non-governmental sectors. The objectives of this study were to determine the prevalence of *E. canis* infection in dogs and their complications in the Chennai Metropolitan Area.

### Materials and Methods

The present study was a part of the clinical study. Medical records of the clinical cases presented to the Small Animal Medicine Referral Clinics and Emergency Critical Care Medicine Referral Clinic of Madras Veterinary College, Chennai, were analyzed. During the one year period of 2020-21, medical records of 268 cases, which were presented with various tick borne diseases were analyzed. All the dogs were subjected to standard physical examinations and screened for vector-borne diseases, as per standard protocols (Selvaraj *et al*, 2010) [6]. Blood samples (4 ml) were collected and 2 ml was placed in an EDTA tube for hematological analysis and the other 2 ml was placed in a serum separator tube and processed for biochemical estimations. Peripheral blood smear was taken for screening for blood parasites. Those cases which had the clinical signs of TBD and that were positive for the TBD in the peripheral blood smear were included in this study.

Those dogs that had clinical signs, but were negative for blood parasites were further subjected to molecular testing; however this study was limited to the blood smear based positive cases alone. Treatment consisted of standard therapy protocols like Doxycycline along with supportive care. Incidence of TBD, status of anemia, thrombocytopenia and pancytopenia due to *E.canis* were evaluated in this study.

## Results and Discussion

Canine monocytic ehrlichiosis (CME) had emerged as a commonest life-threatening tick-borne disease. It was characterized by nonspecific clinical signs, and they included fever, weakness, lethargy, anorexia, lymphadenomegaly, splenomegaly, hepatomegaly and weight loss (Sainz *et al.*, 2015) [5]. Among the TBD cases of 268 identified in this study, 120 cases were ehrlichiosis affected dogs (44.77%) and remained one among the highly prevalent disease in Chennai Metropolitan Area. 66 cases (24.62%) were found to be affected by *Babesia canis* and 59 cases (22.01%) were found to be affected by *Babesia gibsoni*. Together babesiosis affected dogs were 46.63%, which is little higher than the *E.canis* affections. 23 dogs (8.58%) were found to be affected with *H.canis*. A decade ago in 2010, in a study, the incidence of babesiosis due to *Babesia gibsoni* was found to be the highest among young dogs in Chennai (Selvaraj *et al.* 2010) [6]. Such a prevalence levels indicated the enormity of challenges posed by the TBDs in dogs. In this study, ehrlichiosis too added to the existing challenges and underscored the existence of endemic challenges.

*Ehrlichia canis*, was known to affect dogs worldwide, being more prevalent in tropical and subtropical regions, where the brown dog tick *Rhipicephalus sanguineus (sensu lato)*, the primary tick vector, was abundant (Groves *et al.*, 1975) [3]. The prevalence rates of *E. canis* infection in dogs ranged from less than 1% up to 50% in Europe and it was found to be higher in kennelled dogs and in those dogs without external anti-parasitic treatments (Sainz *et al.*, 2015) [5]. The Chennai incidence of 44.77% for *E.canis* is almost similar to the peak incidences observed in Europe. One of the reasons could be the lack of effective tick control programmes among the pet owners in the study area as observed by Sainz *et al.* (2015) [5]. This necessitates large scale adoption of periodical tick control measures so as to reduce the incidence levels of TBDs.

*E. canis* prevalence in dogs were varied and depended on several factors, but it was generally correlated with the level of exposure to infected tick vectors. In a study conducted in Roraima, Northern Brazil, the prevalence of *E. canis* infection was reported to be higher in dogs from urban areas, as compared to dogs from rural areas (Aguiar *et al.*, 2007) [1]. Possibly the high population of dogs in urban households could be one of the reasons. Due to high dog populations, tick may present in some of the clusters of populations continuously and ultimately may lead up to infection spread. A high level (58%) of exposure to *Ehrlichia spp.* among privately owned dogs was observed in Goiana, a city situated in the north-east region of Pernambuco State in North-eastern Brazil (Figueredo, 2017) [2].

The major challenge arises from the varying severity levels of anemia, thrombocytopenia and pancytopenia observed in *E.canis* affected dogs. Among these 120 dogs affected with *E.canis*, anemia was observed in 116 dogs (96.66%); both males and females were equally affected, with an incidence level of 60 cases (51.7%) and 56 cases (48.27%) respectively.

Medium to larger breeds of dogs were found to be affected more; 42.90% of the affected dogs were found to be Labradors.

Thrombocytopenia was the major clinical issue in *E.canis* affected dogs. 118 affected dogs among 120 *E.canis* positive cases were found to have thrombocytopenia. Labradors were found to be more commonly affected by thrombocytopenia. 61 Males (51.6%) and 57 females (48.3%) were affected with thrombocytopenia and no gender based predilections could be observed.

Pancytopenia is yet another crisis observed in *E.canis* affected dogs. 16 dogs (13.33%) out of 120 *E.canis* affected dogs had pancytopenic crisis. Male dogs (10 cases) were found to be affected more by pancytopenia than female dogs (6 cases). Labradors were found to be affected more (43.75%) by pancytopenia. Interestingly toy breeds like Pug and Spit were found to be affected equally with an incidence of 12.5%.

Treatment of *E.canis* associated complications remained a challenge. Those of the dogs affected and had either thrombocytopenia or pancytopenia too longer time to recover and further required advanced therapeutic interventions. Many times the owner's compliance levels played an important role in selection of treatment options. The dog's habitat and their surrounding environmental conditions, the level of ectoparasite infestations in dogs also played important roles as recurrences were observed within a month in few cases. Other factors, like the owner's affordability to get costly medications and continue them for 3 to 4 weeks mattered the most. Affordability of the owners to do periodical tick control and other related preventive measures also played a crucial role. As many of the dog owners in this study had not followed up periodical and effective tick control measures. For all these reasons, the risk of tick infestations and TBDs and specifically Ehrlichiosis and Babesiosis might be high in urban dogs as observed in this study. In a study conducted in the Brazilian Metropolitan region of Recife, tick infestation rates reached 79.3% in owned dogs that were presented to the public veterinary clinic and notably 93.3% in stray dogs (Torres *et al.*, 2004) [7]. Interestingly Chennai Metropolitan Area too had significant stray and community animals and possibly these dogs may had acted as reservoirs of many kinds of parasites. A similar observation was made for low-income countries by Otranto *et al.*, (2017) [4].

## Conclusion

Chennai Metropolitan Area being one among the cities with highest dog populations in India, is facing enormous challenges in pet animal health care front. In this one year period screening study, 268 TBD cases were identified. Among them 120 cases were ehrlichiosis (44.77%); 66 cases (24.62%) were found to be affected by *Babesia canis* and 59 cases (22.01%) were found to be affected by *Babesia gibsoni*. Together babesiosis affected dogs were 46.63%, which is little higher than the *E.canis* affections. 23 dogs (8.58%) were found to be affected with *H.canis*. Among the 120 dogs affected with *E.canis*, anemia was observed in 116 dogs (96.66%); 118 affected dogs were found to had thrombocytopenia and 16 dogs (13.33%) had pancytopenic crisis. These complications highlighted the challenges posed by TBDs and necessitates the better implementation of periodical tick control programmes as well as introduction of community screening programmes at periodical intervals for early detection of TBDs and appropriate interventions.

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