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## Epidemiology of canine ehrlichiosis from 2010-19 in Chennai, India

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### Abstract

Canine Ehrlichiosis is globally distributed vector-borne Haemoprotozoan disease in dogs. The present work was based on retrospective study of 11,000 blood smears of dogs received over a period of nine years (2010 to 2019) in and around Chennai at Madras Veterinary College Teaching Hospital. On blood smear examination 3,840 blood smears were found to be positive for various Haemoprotozoan diseases. Among the recorded positive Haemoprotozoan diseases, the highest incidence was of *Ehrlichia canis* of 2167 cases (56.43%). The percentage change in occurrence of Canine Ehrlichiosis follow the pattern of 2012 (0%), 2013 (-51.9%), 2014 (+84.6%), 2015 (+25%), 2016 (+13.3%), 2017 (+140%), 2018 (18.1%) and 2019 (+4.9%). The most frequent symptoms were fever, anorexia, apathy, abdominal pain, lymphadenopathy and dyspnoea. Regarding haematological alterations, 70.3% of the animals presented anaemia, 58.12% presented thrombocytopenia and 77.3% of animals have Monocytosis. Season-wise occurrence of the disease recorded highest cases in Monsoon (36.31%) followed by Summer (27.69%), Winter (20.26%) and Autumn (15.74%). The prevalence of Canine Ehrlichiosis was highest in Non-descript Dogs (ND) (34.97%), Labrador retriever (25.91%), Spitz (15.28%), German Shepherd (7.25%), Golden Retrievers (5.45%), Pug (4.67), Doberman (3.89%) and others (2.58%) respectively. Maximum number of cases reported were 1,163 cases (53.7%) in the age group of 2-6 years followed by 505 cases (23.3%) in 0-2 years and 498 cases (23%) in above 6 years. The epidemiological study would help the veterinary physician to identify the trends in occurrence of disease and clinical pattern followed by the protozoa, which helps in treatment and control of Canine Ehrlichiosis in dog population.

**Keywords:** Ehrlichiosis, temporal distribution, percentage

### Introduction

Ehrlichiosis is an infectious disease that is caused by a Haemoprotozoan of the genus *Ehrlichia*, which includes species such as *E. canis*, *E. chaffeensis*, and *E. ewingii* and infects several animal species including humans. In Indian Subcontinent, Canine monocytic ehrlichiosis (CME) caused by the obligatory intracellular pleomorphic rickettsia, *Ehrlichia canis*, is considered to be of global importance in canines. The organism is transmitted by the bite of the brown dog tick, *Rhipicephalus sanguineus*, and causes severe clinical manifestations in affected animals [1]. *E. canis* is characterised by the presence of intracytoplasmic inclusion bodies (morulae) in circulating monocytes and lymphocytes. The disease was first described in Algeria in 1935 by Donatien and Lestoquard. Mudaliar (1944) reported *E. canis* infection for the first time in India from Chennai. In the present paper prevalence of canine monocytic ehrlichiosis has been reported according to age, gender and breed. CME is generally suspected when the animal presents with a compatible history of living in or travel to an endemic region and previous tick exposure, and when typical clinical signs and characteristic haematological findings (both in terms of parasitological and pathological interpretations) are present. However, it is difficult to reach a definitive diagnosis based only on clinical and haematological abnormalities as natural infections may be present with a variety of clinical signs that vary between different geographical regions [2]. The detection of morulae of *E. canis* in stained blood smears is a valuable diagnostic tool in the acute disease [3, 4].

### Materials and methods

The study was conducted on the basis blood smear of last nine years i.e. from 2010 to 2019 available in the department for evaluating epidemiology of haemoprotozoan conditions in dogs. The year-wise incidence, percentage increase year-wise, season-wise, breed-wise and age-wise prevalence and clinical manifestation wise were recorded from the case reports.

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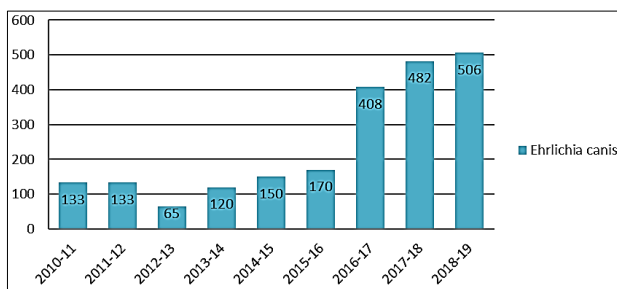
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Diagnosis was made by whole blood and buffy coat smear examination using Geimsa's stain to demonstrate intracytoplasmic inclusion bodies or morulae of *E. canis* in leucocytes (circulating monocytes and lymphocytes) under microscope [5]. The collected data were entered into Excel sheets, which were imported and analyzed using Descriptive statistics (frequency and percentage).

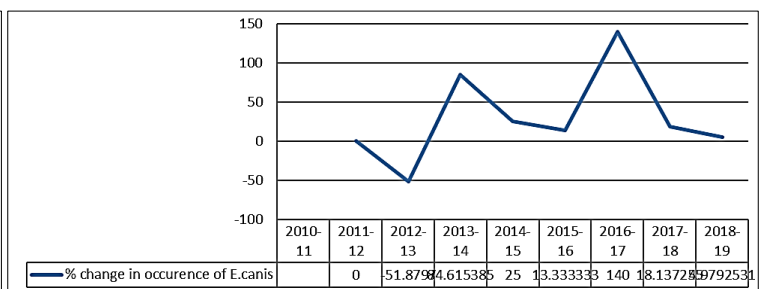
**Results**

The present work was based on retrospective study of 11,000 blood smears of dogs received over a period of nine years (2010 to 2019) in and around Chennai at Madras Veterinary College Teaching Hospital. On blood smear examination 3,840 blood smears were found to be positive for various Haemoprotozoan diseases. Among the recorded positive Haemoprotozoan diseases, the highest incidence was of *Ehrlichia canis* of 2167 cases (56.43%). The percentage change in occurrence of Canine Ehrlichiosis follow the

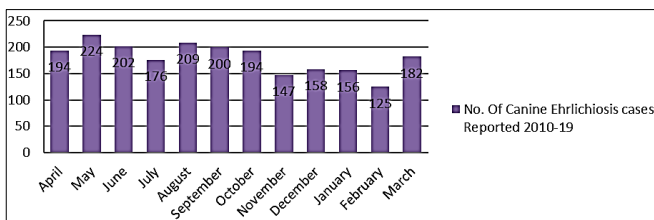
pattern of 2012 (0%), 2013 (-51.9%), 2014 (+84.6%), 2015 (+25%), 2016 (+13.3%), 2017 (+140%), 2018 (18.1%) and 2019 (+4.9%). The most frequent symptoms were fever, anorexia, apathy, abdominal pain, lymphadenopathy and dyspnoea. Regarding haematological alterations, 70.3% of the animals presented anaemia, 58.12% presented thrombocytopenia and 77.3% of animals have Monocytosis. Season-wise occurrence of the disease recorded highest cases in Monsoon (36.31%) followed by Summer (27.69%), Winter (20.26%) and Autumn (15.74%). The prevalence of Canine Ehrlichiosis was highest in Non-descript Dogs (ND) (34.97%), Labrador retriever (25.91%), Spitz (15.28%), German Shepherd (7.25%), Golden Retrievers (5.45%), Pug (4.67), Doberman (3.89%) and others (2.58%) respectively. Maximum number of cases reported were 1,163 cases (53.7%) in the age group of 2-6 years followed by 505 cases (23.3%) in 0-2 years and 498 cases (23%) in above 6 years.



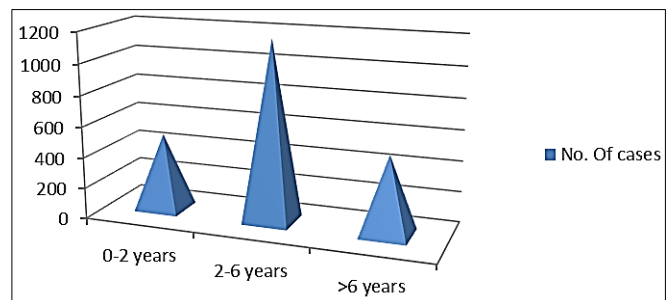
**Fig 1:** Temporal Distribution of *Ehrlichia canis* in Chennai, 2010-19



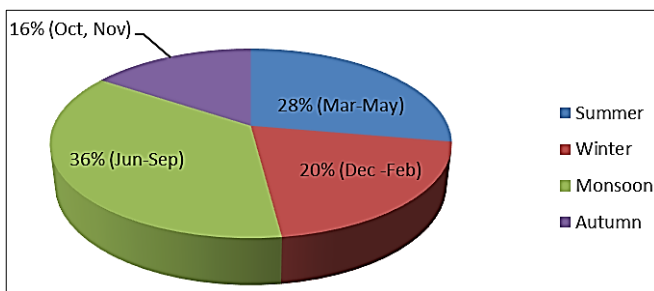
**Fig 2:** % change in occurrence of *E.canis*



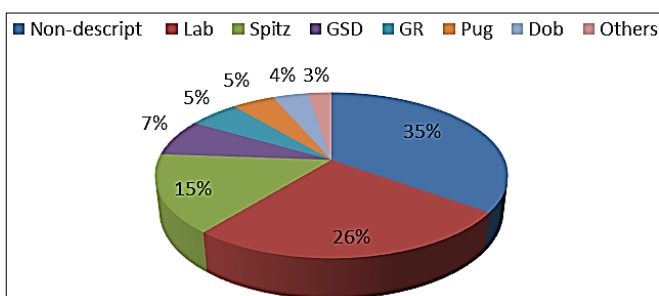
**Fig 3:** Month-wise distribution of *E.canis* cases in 2010-19



**Fig 6:** Age-wise prevalence of Canine Ehrlichiosis



**Fig 4:** Season-wise Canine Ehrlichiosis Occurrence as per IMD in %



**Fig 5:** Breed-wise prevalence of Canine Ehrlichiosis

**Discussions**

Previous *E. canis* experimental studies reported thrombocytopenia in 89% of the infected dogs [6, 7]. In addition, thrombocytopenia was described in every stage of infection, and it persisted during subclinical stages of the disease. The morulae are easily identified by light microscopy during the acute phase of infection (4-5 days after exposure) but difficult to detect when the disease progressed undetected. Some studies reported that only 4% of the blood samples studied showed morulae in blood smears [8, 9, 10]. In this case 56.4% were found positive, which indicates that the search for the morulae in peripheral blood was done in the acute phase [11]. Previous studies reported that the young age dogs were affected with Canine Ehrlichiosis [12, 13]. Previous studies had not observed any differences in prevalence of Canine Monocytic Ehrlichiosis among based on sex, age, and breed or fertility status [14]. The higher numbers may be explained by the popularity of particular breed in particular location. The reason of higher number of positive cases of Canine Ehrlichiosis during Monsoon season is due to maximum

temperature and relative humidity which accounts to the increased tick activity during the period.

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