

Original Research Article

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Clinicopathological Study of Canine Monocytic Ehrlichiosis in Kolkata, India

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ABSTRACT

Canine Monocytic Ehrlichiosis is a worldwide tick borne disease. In dogs, it is usually caused by *Ehrlichia canis*, gram-negative obligatory intracellular bacteria. Clinical signs, haemato-biochemical alterations and microscopical examination of blood smears were conducted in 60 different breeds of dogs of either sex presented to the Veterinary Clinical Complex, West Bengal University of Animal & Fishery Sciences, Kolkata between March and June 2019. The majority of dogs were presented with anorexia, pronounced lethargy, high rise of temperature and generalized lymphadenopathy. Morulae of *Ehrlichia canis* were found in blood smears from 12 dogs. The highest prevalence was found in Labrador. Many of the dogs had tick infestation and the ticks on dogs were identified as *Rhipicephalus sanguineus*. The most common haemato-biochemical alterations were marked anaemia, leukocytosis, erythrocytopenia, thrombocytopenia, neutrophilia, lymphopenia and eosinophilia followed by hyperproteinaemia, hypoalbuminaemia, hyperglobulinaemia, hyperbilirubinaemia, elevated activities of AST, ALT and ALKP, decreased increased BUN and creatinine levels. Majority of the dogs reflected a rapid clinical response to doxycycline along with supportive therapy.

Keywords

Canine Monocytic
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Introduction

Canine Monocytic Ehrlichiosis is a widespread tickborne infection (*Rhipicephalus sanguineus*, the brown dog tick) of canine caused by *Ehrlichia canis*, a gram-negative obligatory intracellular bacteria belonging to the family *Anaplasmataceae*. It is reported to have global distribution, but its prevalence in a particular region requires the presence of the vector, the brown dog tick. The objective of the present study was to record the distribution of canine monocytic ehrlichiosis in different breeds of dogs in Kolkata and correlation with

clinicopathology. Clinical signs of this disease vary based on acute, chronic and subclinical phase. Generally, this infection is mainly characterized by high rise of temperature (103-105°F), anorexia and general weakness accompanied by oedematous swelling in the dependant part, epistaxis and lymphadenopathy (Kottadamane *et al.*, 2017).

Materials and Methods

The present study was conducted in 60 dogs of different breeds presented to the Veterinary Clinical Complex, West Bengal University of

Animal & Fishery Sciences, Kolkata. After thorough clinical examination, the dogs with characteristic signs of ehrlichiosis and thrombocytopaenia were screened by blood smear examination with Giemsa staining and blood samples were subjected to evaluate the detail hemato-biochemical alterations. The blood samples drawn from affected dogs were subjected for hematological studies *viz.* hemoglobin (Hb), total leukocyte count (TLC), differential leukocyte count (DLC), and total platelet count) using conventional methods, and harvested serum samples were utilized for biochemical estimation *viz.* total protein, albumin, bilirubin, aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALKP), blood urea nitrogen (BUN) and creatinine by biochemical semi autoanalyser (Transasia Bio-medical Ltd., Solan, HP). Results obtained from blood smear examination and hemato-biochemical alterations were compared and analyzed to draw the conclusive diagnosis.

Statistical analysis

Data obtained in different parameters were statistically analyzed by one-way analysis of variance at 5% level of significance using SPSS software.

Results and Discussion

History, clinical signs and the haematological and biochemical studies and microscopical examination of blood smears were conducted in 60 different breeds of dog of either sex between March and June 2019. The majority of the affected dogs had anorexia, pronounced lethargy, high rise of temperature and generalized lymphadenopathy. Many of the dogs had tick infestation and the ticks on dogs were identified as *Rhipicephalus sanguineus*. Majority of the dogs reflected a rapid clinical response to doxycycline along with supportive

therapy. Out of 60 suspected dogs for ehrlichiosis, based on peripheral thin blood smear examination, 12 (20%) cases were positive for the morulae of *Ehrlichia canis* in monocytes. The highest prevalence was found in Labrador.

Parasitological prevalence

Giemsa stained peripheral thin blood smear examination exhibited 20% (12/60) positivity for the morulae of *E. canis*. It was found as intracytoplasmic inclusion bodies of varying sizes and shapes in monocytes (Fig. 1). The most of the morulae were detected in monocytes as homogeneous and dense inclusions.

Breed-wise distribution

The breed-wise distribution of Canine Monocytic Ehrlichiosis was depicted in Table 1. The highest prevalence was recorded in Labrador. Usually, in the study area and within the study period, Labrador and German Shepherd dog (GSD) breeds were presented more to the Veterinary Clinical Complex, Kolkata. Dogs positive by microscopy exhibited clinical signs comprised of fever, congested mucus membrane, tick infestation, anorexia, lymphadenopathy, loss of weight, emesis, respiratory distress, epistaxis, petechiae, depression, bleeding tendency, oedema of legs and lethargy.

Hemato-biochemical alterations

The present haemato-biochemical study revealed marked anaemia, leukocytosis, erythropanaemia, thrombocytopaenia, neutrophillia, lymphopaenia and eosinophilia (Table 2) followed by hyperproteinaemia, hypoalbuminaemia, hyperglobulinaemia, hyperbilirubinaemia, elevated activities of AST, ALT and ALKP, decreased increased BUN and creatinine levels (Table 3).

Fig.1 Morulae of *Ehrlichia canis* in monocytes of dogs

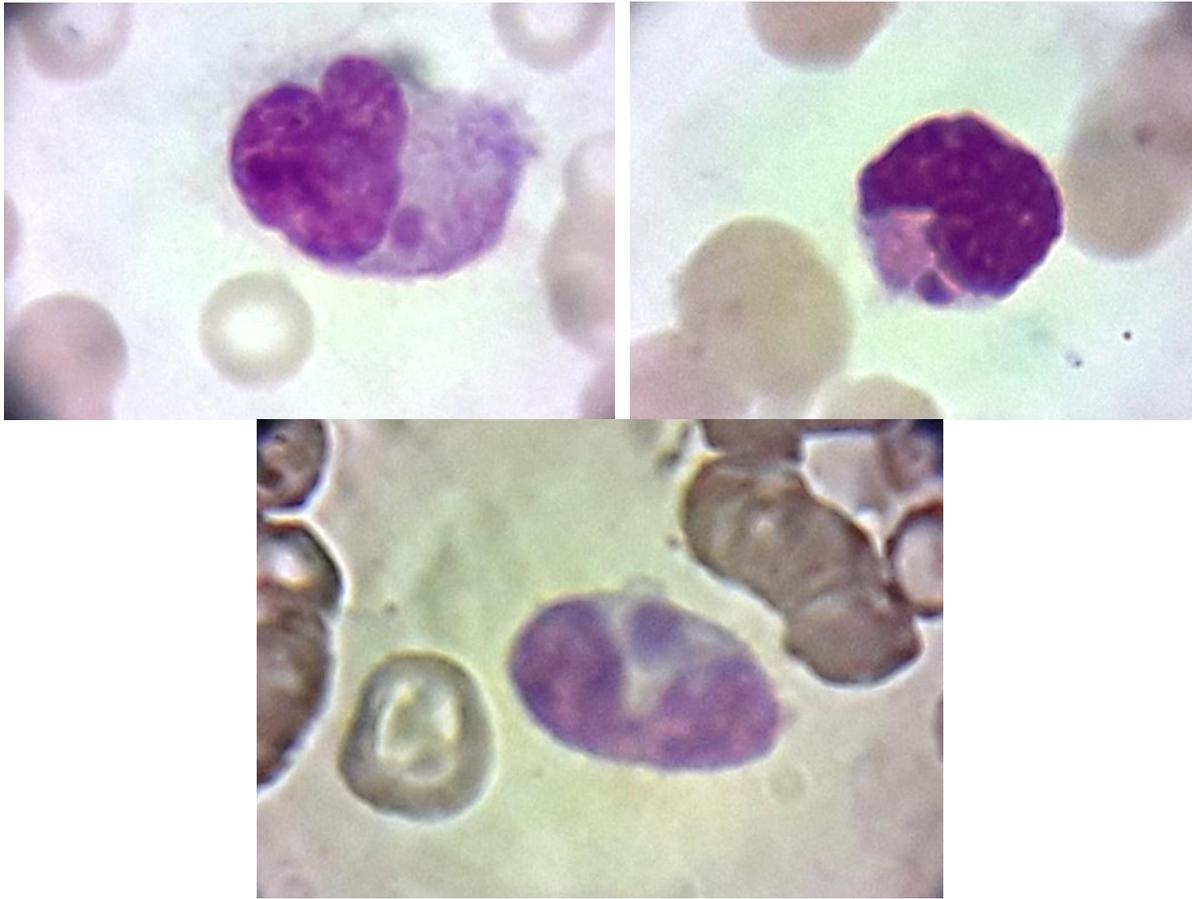


Table.1 Breed-wise distribution of Canine Monocytic Ehrlichiosis

Breed	Positive in Giemsa stained blood smear (n=12)	Positivity (%)
Labrador	4	33.3%
GSD (German shepherd dog)	3	25%
Pug	2	16.7%
Saint Bernard	2	16.7%
Cocker Spaniel	1	8.3%

Table.2 Haematological alterations of positive dogs for Ehrlichiosis

Parameters	Positive (n=12)	Control (n=8)
Hb (g/dL)	8.18±2.28 ^a	13.17±0.67 ^b
PCV (%)	25.89±5.73 ^{ab}	38.14±2.72 ^c
TEC (10 ⁶ /μL)	4.13±2.26 ^{ab}	6.51±0.32 ^b
TLC (10 ³ /μL)	12.35±6.18 ^a	7.96±1.21 ^a
Platelet (10 ⁵ /μL)	0.49±0.28 ^a	4.03±0.15 ^b
Neutrophils (%)	78.43±13.48 ^a	73.54±2.36 ^a
Lymphocytes (%)	20.57±14.15 ^a	27.02±3.53 ^a
Eosinophils (%)	1.48±2.14 ^a	2.5±1.23 ^a

Figures with different superscripts in a row differ significantly (p<0.05)

Table.3 Biochemical alterations of positive dogs for Ehrlichiosis

Parameters	Positive (n=12)	Control (n=8)
TP (g/dL)	7.46±1.25 ^a	6.3±0.53 ^a
Albumin (g/dL)	2.15±0.66 ^{ab}	3.18±0.33 ^b
Globulin (g/dL)	4.72±1.49 ^b	3.32±0.63 ^a
BUN (mg/dL)	23±10.56 ^a	16.3±4.63 ^a
Creatinine (mg/dL)	1.39±0.58 ^b	0.86±0.31 ^a
Total bilirubin (mg/dL)	0.88±1.16 ^a	0.46±0.12 ^a
AST (U/L)	27.55±13.00 ^b	12.9±1.33 ^a
ALT (U/L)	58.17±27.17 ^b	26.13±8.56 ^a
ALKP (U/L)	133.33±46.26 ^b	82.7±13.15 ^a

Figures with different superscripts in a row do not differ significantly (p<0.05)

Blood smear examination and clinical findings

The present observations of microscopic study were corroborated with the findings of earlier workers (Eljadar, 2010; Dhankar *et al.*, 2011; Shukla *et al.*, 2011). The clinical findings in dogs affected with canine monocytic ehrlichiosis were simulating with the earlier reports (Sacchini *et al.*, 2007; Das and Konar, 2013).

Breed wise distribution

In the present communication, the disease prevalence was highest in Labrador breed of dogs (Table 1) in comparison to others. Earlier workers also reported that Labrador breed of dogs was most susceptible

(Chandrasekar *et al.*, 2002; Bhadesiya and Modi, 2015; Kottadamane *et al.*, 2017).

Hemato-biochemical findings of ehrlichiosis

In the present study marked anaemia, leukocytosis, erythropania, thrombocytopenia, neutrophillia, lymphopenia and eosinophilia (Table 2) followed by hyperproteinaemia, hypoalbuminaemia, hyperglobulinaemia, hyperbilirubinaemia, elevated activities of AST, ALT and ALKP, decreased increased BUN and creatinine levels (Table 3) were the most common observations in diagnosing the canine ehrlichiosis. Bhadesiya and Modi, 2015 also observed significantly decreased mean values of Hb, PCV, TEC and TLC along with

marked thrombocytopenia in canine ehrlichiosis. Sasanelli *et al.*, (2009) also evidenced elevated values of ALT, AST, ALKP, BUN and creatinine accompanied by hyperbilirubinaemia. Asgarali *et al.*, (2012) opined that thrombocytopenia is the typical characteristic feature of canine ehrlichiosis. Kottadamane *et al.*, (2017) also reported the same biochemical alterations in canine ehrlichiosis. Hypoalbuminaemia and elevated level of ALT activity were also recorded earlier in canine ehrlichiosis (Kottadamane *et al.*, 2017).

The present communication concluded that prevalence and distribution of canine ehrlichiosis in India remain largely unexplored and microscopy was the more useful tool for detecting chronic and clinical infections.

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