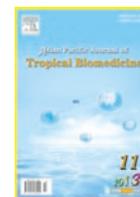




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Clinical and hematological study of canine Ehrlichiosis with other hemoprotozoan parasites in Kolkata, West Bengal, India

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PEER REVIEW

Peer reviewer

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Comments

This paper found the canines caused by mixed ehrlichiosis with other hemoprotozoan diseases which may present with marked hematological changes and characteristics symptoms that need urgent treatment. It is important for vet practice and also to human health because some of this disease is zoonotic.
Details on Page 915

ABSTRACT

Objective: To observe other hemoprotozoan diseases with canine ehrlichiosis and to evaluate the clinical and hematological aspects of dogs naturally infected with ehrlichiosis with other hemoprotozoan diseases.

Methods: Blood was collected for hematological value and Giemsa stained blood smear was made for diagnosis of *Ehrlichia* sp. and other hemoprotozoan parasites from naturally infected dogs. Case history was taken from the owner and clinical signs and symptoms were noted.

Results: A total of 47 cases of ehrlichiosis in dogs were reported with babesiosis (8.51%) and hepatozoonosis (6.38%) hemoprotozoan diseases. *Ehrlichia canis*, *Ehrlichia ewingii*, *Brucella canis*, *Babesia gibsoni* and *Hepatozoon canis* were observed under oil immersion lense of microscope in Giemsa stained peripheral blood smears. Marked anaemia and neutrophilic leukocytosis were observed.

Conclusions: The results of this study stated that clinical and haematological changes occurred in canine ehrlichiosis with babesiosis and hepatozoonosis due to parasitemia. In mixed infection, the disease more severe, and also it depended on immunity of animals. *Babesia gibsoni* and *Hepatozoon canis* with *Ehrlichia* sp. were first reported from West Bengal state of India by this study.

KEYWORDS

Canine, Clinical, *Ehrlichiosis*, Hematological, Hemoprotozoan, Kolkata

1. Introduction

Tick infestation occurs in tick borne rickettsial and hemoprotozoan diseases. Diseases spread from infected animals to healthy animals via infected ticks. Canine ehrlichiosis is a tick borne rickettsial disease, also known as tropical canine pancytopenia or canine rickettsiosis which infects leukocytes^[1,2]. Canine babesiosis and hepatozoonosis are tick borne hemoprotozoan diseases which infect erythrocytes and neutrophils or monocytes respectively. In Kolkata, a huge infestation of tick borne rickettsial and hemoprotozoan diseases occurred every year. The present study was aimed to evaluate clinical and hematological aspects of dogs naturally infected with

Ehrlichia canis (*E. canis*) and *Ehrlichia ewingii* (*E. ewingii*) with other hemoprotozoan diseases and their observation in Veterinary Emergency Unit, WBUAFS Kolkata, West Bengal, India.

2. Materials and methods

In Kolkata, a total of 47 cases of ehrlichiosis were reported in domestic dogs in Veterinary Emergency Unit, WBUAFS Kolkata from May, 2011 to June, 2012. This study was done in 47 naturally infected dogs of both sexes (32 males and 15 females) of different breeds (Descript-39 and Non Descript-8) and ages. Diagnosis was done on the basis

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of clinical signs and symptoms and hematological study. Clinical signs and symptoms and case history from the owner were noted in the case register copy. Blood was collected from peripheral veins and kept in ethylene diamine tetraacetic acid vial for hematological value examination. Confirmatory diagnosis was done by light microscopic pictures of Giemsa stained peripheral blood smears derived from infected dogs.

3. Results

Case history was taken from the owners and clinical signs and symptoms were observed *i.e.* anorexia (68.05%), fever mild to moderate (80.85%), oculonasal discharge (corneal opacity 21.27%) (Figure 1), weight loss (36.17%), pale visible mucous membrane (61.70%), muscular and joint pain (25.53%), lymphadenopathy (8.51%), vomiting (44.68%), diarrhea (31.91%), epistaxis or mucosal bleeding (25.53%) (Figure 1) or coffee colour urine (6.38%). Tick infestation or previous history of tick infestation was found in 100% cases.

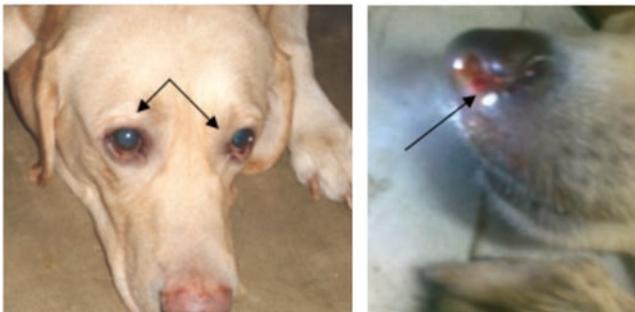


Figure 1. Corneal opacity in ehrlichiosis infection and epistaxis in ehrlichiosis infection.

The changes of the erythrogram were marked anaemia (80.95%), decreased erythrocyte and packed cell volume values (Table 1). The reference was based on Bush[3].

Table 1

Values of the hematological parameters of 47 domestic dogs infected naturally by ehrlichiosis, babesiosis and hepatozoonosis

Parameters	Values	Reference
RBC ($\times 10^{12}$ cells/L)	4.36 \pm 1.88	5.5–8.5
Hb (g/L)	86.0 \pm 41.2	120–180
PCV (%)	25.44 \pm 13.28	37–55
WBC ($\times 10^9$ cells/L)	15.68 \pm 5.32	6–17
Neutrophil ($\times 10^9$ cells/L)	14.20 \pm 4.22	3–11.5
Eosinophil ($\times 10^9$ cells/L)	0.39 \pm 0.27	0.1–1.25
Basophil ($\times 10^9$ cells/L)	0.0 \pm 0.0	0
Lymphocyte ($\times 10^9$ cells/L)	3.26 \pm 1.34	1–4.8
Monocyte ($\times 10^9$ cells/L)	0.76 \pm 0.38	0.15–1.35
Thrombocyte ($\times 10^9$ cells/L)	198.6 \pm 61.8	200–500

RBC: red blood cells, Hb: hemoglobin, PCV: packed cell volume, WBC: white blood cell.

The changes of the leukogram were neutrophilic leukocytosis (48.93%) and eosinopenia (42.55%). Thrombocytopenia was observed in 51.06% cases. A total of 8.51% of babesiosis and 6.38% of hepatozoonosis with ehrlichiosis were observed under oil immersion lense of microscope in Giemsa stained blood smears. Among 47 cases of ehrlichiosis, 32 samples of *E. canis* (Figure 2), eight samples of *E. ewingii* (Figure 2), three samples of both *E. canis* and *Babesia canis* (*B. canis*) (Figure 3), one sample of

both *E. canis* and *Babesia gibsoni* (*B. gibsoni*) (Figure 3) and 3 samples of both *E. canis* and *Hepatozoon canis* (*H. canis*) (Figure 4).

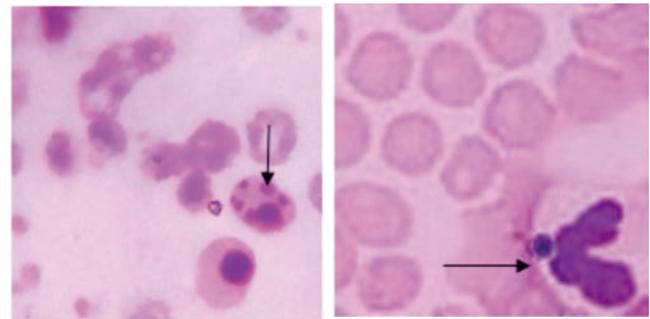


Figure 2. Giemsa stained blood smear showing monocytic *E. canis* and neutrophilic *E. ewingii* in dog (oil immersion).

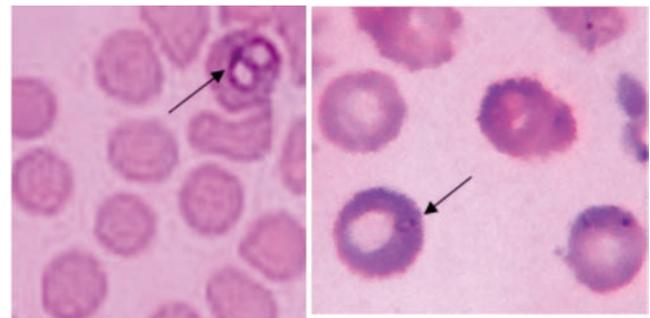


Figure 3. Giemsa stained blood smear showing *B. canis* and *B. gibsoni* in dog (oil immersion).

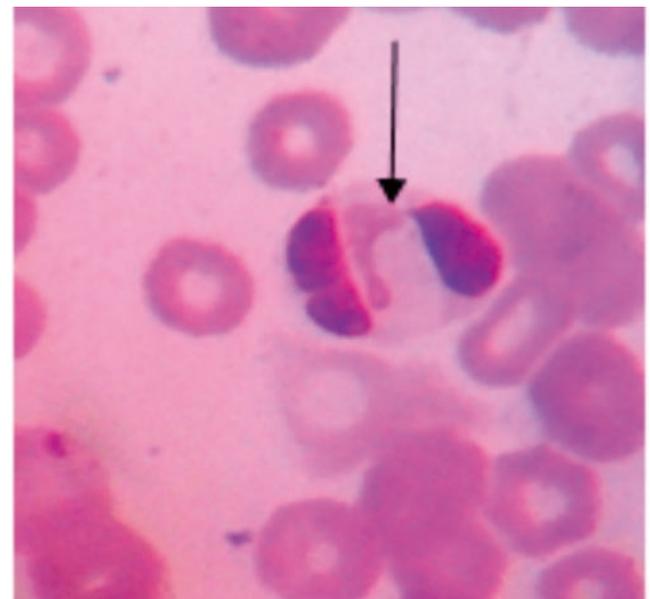


Figure 4. Giemsa stained blood smear showing *H. canis* in dog (oil immersion).

4. Discussion

Ehrlichiosis, babesiosis and hepatozoonosis mixed infection were previously reported from various region of India[4]. But *B. gibsoni* and *H. canis* with ehrlichiosis were first described from Kolkata district, which was also from West Bengal state of India. In Kolkata, the report of ehrlichiosis was the highest than other two hemoprotozoan diseases. *E. ewingii* was the etiological agent of canine granulocytic (seen in neutrophil) ehrlichiosis[2], but *E. canis*

was the etiological agent of canine monocytic (morula stage in monocyte) ehrlichiosis[1]. *B. canis* was the large pyriform, dividing stage and *B. gibsoni* was small ovoid in the red blood cells[5]. *H. canis* gametocytes were identified in neutrophils[6].

Anorexia and weight loss occurred due to parasitic infestation. Increased corneal opacity and epistaxis were frequently seen in ehrlichiosis[1]. Bleeding occurred continuously from nasal cavity due to thrombocytopenia. Anaemia and neutrophilic leukocytosis were observed in three parasitic diseases which may be due to acute form and mixed parasitic infestation[4,7,8]. Hemoglobinuria or coffee colour urine was a characteristic clinical sign in babesiosis as it destructed red blood cells[8]. In *H. canis* and *E. ewingii* infestation, muscular and joint pain occurred due to hemarthrosis or immune complex deposition in the joint, leading to arthritis[2]. Studies on tick biology indicate that a small percentage of ticks are responsible for harbouring multiple pathogens and transmitting all pathogens to the host[9]. Diseases occurred through *Rhipicephalus sanguineus* tick bite in ehrlichiosis[2,10] and babesiosis[11] and by ingestion of infected tick in hepatozoonosis[6] which may be fatal. Canine ehrlichiosis infestation did not depend on age, breed or sex which was observed in this study. Marked hematological changes and characteristics symptoms were observed due to low immune status[12] of some animals in secondary bacterial infections[10] and severity of the disease for mixed infections[2]. These cases were treated in Veterinary Emergency Unit. All cases were recovered except two ehrlichiosis and babesiosis mixed infections due to advanced stage of disease.

Conflict of interest statement

We declare that we have no conflict of interest.

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Comments

Background

This study aims to evaluate the clinical and hematological aspects of dogs naturally infected with ehrlichiosis with other hemoprotozoan diseases e.g., babesiosis and hepatozoonosis in Kolkata, West Bengal, India.

Research frontiers

This study found in mixed infection, the disease was more severe, and *B. gibsoni* and *H. canis* with *Ehrlichia* sp. were first reported from West Bengal state of India by this study.

Related reports

The changes of the erythrogram were marked anaemia, decreased erythrocyte and packed-cell volume values. The

changes of the leukogram were neutrophilic leukocytosis and eosinopenia. Thrombocytopenia was observed in most of cases.

Innovations and breakthroughs

Clinical and hematological data concerning dogs naturally infected with ehrlichiosis with other hemoprotozoan diseases such as babesiosis and hepatozoonosis are rare in canines.

Applications

Low immune status or advanced aged canines caused by mixed ehrlichiosis with other hemoprotozoan diseases may present with marked hematological changes and characteristics symptoms that need urgent treatment.

Peer review

This paper found the canines caused by mixed ehrlichiosis with other hemoprotozoan diseases which may present with marked hematological changes and characteristics symptoms that need urgent treatment. It is important for vet practice and also to human health because some of this disease is zoonotic.

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