



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 3133-3136
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www.thepharmajournal.com

Received: 14-03-2023

Accepted: 18-04-2023

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Therapeutic management of canine Ehrlichiosis in Nagaland, India

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Abstract

An adult 7-year-old female local dog was presented at the Veterinary Clinical Complex, College of Veterinary Sciences and Animal Husbandry, Jalukie, Nagaland, with a history of anorexia, high fever, severe panting, heavy tick infestation, and unilateral epistaxis. Clinical examination showed pale conjunctiva and an enlarged popliteal lymph node. The haematological findings showed marked anaemia and thrombocytopenia. A parasitological examination revealed it to be positive for *Ehrlichia canis* and confirmed the ticks to be *Rhipicephalus sanguineus*. The SNAP@4Dx@plus test was also used to confirm the case. The dog was treated with doxycycline at 10 mg/kg for 28 days, once daily, with other supportive therapy. After 15 days, the dog had made a significant recovery, and blood tests confirmed no parasitaemia.

Keywords: Canine, doxycycline, *Ehrlichia canis*, *Rhipicephalus sanguineus*, SNAP@4Dx@plus test, thrombocytopenia

Introduction

Canine Ehrlichiosis also known as tropical pancytopenia and canine monocytic ehrlichiosis (CME) is one of the major tick-transmitted diseases of dogs and is caused by *Ehrlichia canis* (order *Rickettsiales*, family *Anaplasmataceae*), a gram negative, obligatory intracellular rickettsial organism (Unver *et al.*, 2006) [1] and is highly prevalent in tropical and subtropical areas including India (Keefe *et al.* 1982, Matthewman *et al.* 1993, Baneth *et al.* 1996, Harrus *et al.* 1998, Pretorius and Kelly 1998, Batmaz *et al.* 2001, Suto *et al.* 2001) [2-8], including India (Singla *et al.* 2011) [9]. The distribution of the disease is related to the distribution of the vector, *Rhipicephalus sanguineus* (brown dog-tick) which transtadially transmit the disease to its canine host (Johnson *et al.* 1998) [10]. Dog, coyote, red fox and golden jackal are important reservoir of infection in nature (Neer 1998) [11]. Among the various Ehrlichia species, *E. canis*, the most important species of Ehrlichia in dogs parasitized the circulating monocytes intracytoplasmically in the form of clusters called morulae, causing serious and potentially fatal disease called as canine monocytic ehrlichiosis (CME) that requires rapid and correct diagnosis in order to initiate suitable therapy leading to a favourable prognosis (McBride *et al.* 2001) [12].

Ehrlichiosis has three phases *viz.* acute, subclinical and chronic based on its clinical manifestations and have an incubation period ranging from 8 to 20 days. Acute infection is generally manifested by high fever, anorexia, dyspnoea, depression, lymphadenopathy and weight loss with leucopenia, thrombocytopenia and hypergammaglobulinemia in the blood result. Acute illness is followed by long duration subclinical and chronic phases with recurring clinical symptoms such as pancytopenia, hemorrhage, secondary bacterial infection and apparent weight loss (Buhles *et al.* 1974) [13]. Chemotherapeutic treatment with 28 day regimen of doxycycline has been found to be the most acceptable treatment globally in spite of reports of persistent carrier status of dog. Therapy with midocarb dipropionate have been used with variable rate of success (Iqbal *et al.* 1994) [14].

Material and Method

Clinical history

An adult 7-year-old female local dog was presented at the Veterinary Clinical Complex, CoVSc & AH, Jalukie, Nagaland, with a history of inappetance, severe panting, heavy tick infestation, and unilateral epistaxis, along with a history of whelping a month ago.

The dog, when forced to walk, showed a staggering gait, which indicates immense weakness. The deworming and vaccination history of the dog were done regularly and on time.

Clinical examination

The dog was found to have a normal rectal temperature (102.2 °F), a pale mucous membrane, an increased respiratory rate, a tick infestation, and enlarged mandibular and popliteal lymph nodes. On examination, there was the presence of sclera bleeding (Fig. 1), unilateral epistaxis (Fig. 2), and ecchymotic hemorrhagic spots in the abdominal region around the mammary gland (Fig. 3). The blood samples were collected for haematological examination. A blood smear and ticks were sent to the Department of Parasitology, CoVSc, and AH, Jalukie, for parasitological examination and identification of the ticks. The SNAP 4Dx Plus test IDEXX, an *in vitro* test for the detection of antibodies to *Ehrlichia canis*, *Ehrlichia ewingii*, *Anaplasma phagocytophilum*, *Borrelia burgdorferi*, *Anaplasma platys*, and *Dirofilaria immitis* in canine serum, plasma, or anticoagulated whole blood, was used following the manufacturer's instructions.

Results and Discussion

The haematological examination revealed leucopenia, normocytic normochromic anaemia and a severe thrombocytopenia (Table 1). Parasitological examination of the thin blood smear showed that the dog was positive for *E. canis* after Giemsa's staining (Fig. 4). The anticoagulated whole blood was found positive for *E. canis* using SNAP 4Dx Plus test kit (Fig. 5). The ticks were confirmed as *Rhipicephalus sanguineus*, the brown dog tick, and the principal vectors of *E. canis* and *Babesia canis*. No further co-infections with other hemoproteoans were observed on the slide.

Treatment

On confirmation of ehrlichiosis in the dog, immediate treatment with a 28-day course of oral doxycycline at 10 mg/kg once daily and two shots of imidocarb dipropionate at 5 mg/kg with an interval of 14 days, along with supportive therapy, was also given. The dog started showing recovery with the control of epistaxis 24 hours post-treatment, and on day 14 post-treatment, blood examination did not reveal any parasitaemia in the examined slide.

In the present study, based on the anamnesis, the clinical examination, the hemological results, rapid test and the microscopic detection of *Ehrlichia canis* in the blood smear, it was confirmed as a case of canine monocytic ehrlichiosis (CME). This disease invariably has an affinity for the hemopoietic cells of the body, which results in leucopenia and thrombocytopenia. Mild to severe thrombocytopenia in *Ehrlichia*-infected dogs has been reported in the literature (Singla *et al.* 2011, Codner and Farris-Smith 1886, Niwetpathomwat *et al.* 2006, Das and Konar 2013, Macieira *et al.* 2005) [9, 15-18]. Besides the detection of the parasite in the microscopic slide examination, the estimation of hematobiochemical parameters holds equal importance in the correct diagnosis and treatment of naturally occurring ehrlichiosis.

In India, *E. canis* infection has been reported from different parts of the country with a varied prevalence rate (Singla *et al.* 2011, Das and Konar 2013, Harikrishnan *et al.* 2009, Dhankar

et al. 2011, Lakshmanan *et al.* 2011, Bhadesiya *et al.* 2015) [9, 17, 19-22]. Ehrlichiosis in Northeast India has also been reported (Barman *et al.* 2014) [23], whereas with regard to Nagaland, India, no documented report is available, and this is the first recorded case of ehrlichiosis in dogs.

Table 1: Haematological and biochemical parameters of the Ehrlichiosis case

Blood parameters	Values	Reference standard
Hb (g %)	9.2	12-18
TEC (million/cmm)	3.24	5-7.9
TLC (thousand/cmm)	5.36	5-14.1
Neutrophils (%)	62.9	58-85
Lymphocyte (%)	36.9	8-21
Eosinophil (%)	5	0-9
PCV (%)	24.7	35-57
MCV (fL)	76.23	66-77
MCH (pg)	17.0	21-26.2
MCHC (g/dl)	37.25	32-36.3
Platelet count (lakhs/cmm)	0.59	2.11-6.21
Serum creatinine (mg/dl)	1.11	0.5-1.7
BUN (mg/dl)	31.44	8-28
SGPT (IU/l)	12.38	10-109



Fig 1: Sclera bleeding

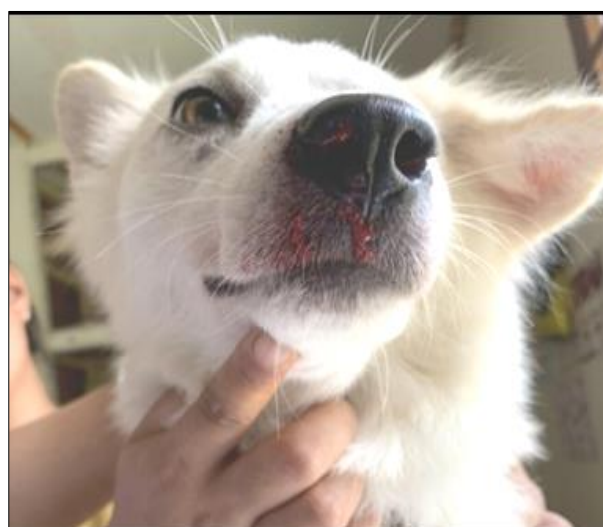


Fig 2: Unilateral epistaxis



Fig 3: Echymotic haemorrhage in the abdomen



Fig 4: Engorged *Rhipicephalus sanguineus*



Fig 4: Morula of *E. canis* in the monocyte of dog under oil immersion ($\times 1000$) in a Giemsa stained blood smear

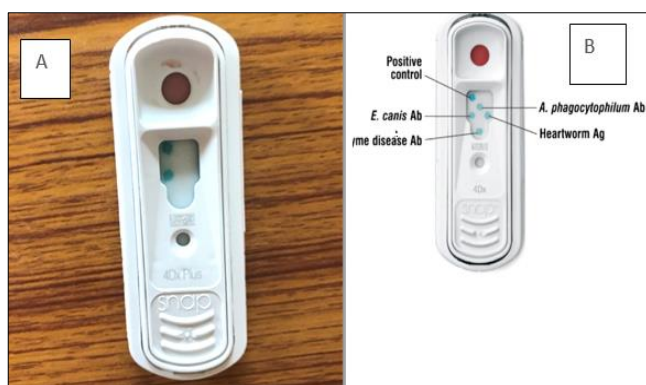


Fig 5: A. 4Dx Plus positive for *Ehrlichia canis*. B. Snap Test reference guide

Conclusion

It may be concluded that canine ehrlichiosis causes acute illness, followed by long-lasting subclinical and chronic stages with recurrent clinical signs. It is highly essential to detect the infection at the earliest, since *Ehrlichia* can easily develop into a chronic stage, during which dogs don't show signs of illness but the organism is still destroying blood cells and causing major inflammation in the eyes, brain, or kidneys. Blood parameters, the presence of tick infestation, the detection of morula from peripheral blood smears, and antigen detection are all crucial for the diagnosis of *E. canis*.

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