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Successful therapeutic management of canine monocytic ehrlichiosis in German shepherd dog

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Abstract

Canine ehrlichiosis is tick-borne haemoparasitic disease of dog caused by *Ehrlichia canis*. It is a most prevalent pathogens affecting the dogs in India and also posing zoonotic risk to the public health implications. The present case report discusses the successful clinical management of a 3.5-year-old male German Shepherd dog presented to the Veterinary hospital, Chopan, Sonbhadra, UP with fever, anorexia, vomiting, epistaxis, melena, and generalized peripheral lymphadenopathy. Clinical examination showed pale conjunctiva, bleeding from both nostrils and enlarged popliteal lymph node. Haematological examination revealed severe thrombocytopenia, marked anaemia, leukocytosis, and lymphocytosis. Peripheral blood smear examination demonstrated the presence of *Ehrlichia canis* morulae within monocytes, confirming a case of canine monocytic ehrlichiosis (CME). Biochemical analysis showed marked elevation of hepatic enzymes (ALT and AST). The dog was treated with doxycycline for 30 days along with supportive therapy of hemostatic, hepatoprotective agents, antiemetics, hematinics, immunomodulators, and gastric protectants. Treated dog exhibited complete clinical recovery after 15 days of treatment and no parasitemia was observed on blood smear examination.

Keywords: Canine monocytic ehrlichiosis, *Ehrlichia canis*, epistaxis, doxycycline

1. Introduction

Canine ehrlichiosis is a highly significant and fatal tick-borne disease primarily transmitted by the brown dog tick, *Rhipicephalus sanguineus* ^[1, 2]. It is caused by the gram negative, obligate intracellular rickettsial *Ehrlichia canis* organism ^[3]. Several *Ehrlichia* species have been established, *E. canis* is most common among them for clinical ehrlichiosis in dog ^[4]. In 1925, Cowdry identified the *Ehrlichia* from cattle in Africa as *Ehrlichia ruminantium* which was first case of veterinary disease and a decade later *E. canis* was described by Donatien and Lestoquard in Algerian dogs ^[5]. Globally, *E. canis* is endemic in tropical and subtropical regions including India, as higher prevalence of tick population in these regions ^[4, 6]. Several works have highlighted the disease distribution depends on the epidemiology of brown dog ticks, impart vital role in transstadial transmission of infection in dogs ^[7, 8]. Generally, the life cycle of *E. canis* consists of three intracellular stages viz. initial bodies, morulae (aggregate of initial bodies) and elementary body, the presence of these intracytoplasmic morulae in peripheral blood smear examination helps in diagnosis of clinical disease condition of ehrlichiosis. The clinical manifestation of disease may occur in three forms as acute, subclinical and chronic form ^[9]. Canine monocytic ehrlichiosis frequently presented with clinical signs of acute fever, anorexia, anaemia, epistaxis, petechiae, echymoses, hematuria, melena and prolonged estrual haemorrhage associated with thrombocytopenia, thrombocytopathy or vasculitis. Furthermore, ocular symptoms such as anterior uveitis, corneal opacity, subretinal haemorrhage, retinal detachment or complete loss of vision are more characteristic of canine ehrlichiosis ^[10, 11].

The prevalence of ehrlichiosis is significantly higher in urban areas where tick control management is inadequate. While epidemiological data do not demonstrate a significant predilection based on the age, sex or breed but the German Shepherd dog breed generally exhibit more severe clinical manifestations which is due to an underlying, genetically mediated

impairment in the host immune response^[12]. The zoonotic potential of the pathogen is of significant clinical concern, as *Ehrlichia canis* has been identified as causative agent in case of human monocytic and granulocytic ehrlichiosis, thereby establishing as relevant public health threat^[13]. Epidemiologically, the key risk factors for transmission include high tick infestation, outdoor housing and close contact with infected dogs. The present report outlines the clinical presentation, diagnosis and successful therapeutic management of a confirmed case of *Ehrlichia canis* infection in German Shepherd dog.

Methodology and Observations

Case history

A 3.5-year-old male German Shepherd dog was presented at Veterinary hospital, Chopan, Sonbhadra, UP with history of fever, anorexia, vomiting, bilateral epistaxis (bleeding from nose), melena (black tarry colour faces), reduced activity and weakness with history of tick infestation. Clinical examination showed high body temperature (104°F), pale mucous membrane, bleeding from both nostrils and enlarged popliteal lymph node. The blood sample was collected for haematological, biochemical and parasitological analysis. The blood smear was brought to the Department of Veterinary Parasitology, Faculty of Veterinary and Animal Sciences, RGSC, BHU for parasitological examination.

Haematological examination

The collected blood and serum samples were immediately used for haemato-biochemical analysis. The complete blood count (CBC) and serum biochemical analysis was performed by using automated blood and serum biochemical analyser. The obtained values were compared with standard reference values and interpretate the outcomes of findings.



Fig 1. Presented German Shepherd dog with nasal bleeding

The results of haematological examination revealed severe thrombocytopenia, marked anaemia, leucocytosis, and lymphocytosis. The biochemical analysis showed marked elevation of hepatic enzymes (ALT and AST) indicates hepatic disturbance which may resulted in the increased blood urea nitrogen (BUN) value.

Table 1: Haemato-biochemical parameters of *E. canis* infected dog

Haematological parameters	Values	Reference range
Haemoglobin (Hb) (g/dl)	5.6	12-18
RBC count (millions/mm ³)	2.59	5.0-7.9
PCV (%)	17.9	35-57
Total WBC count (10 ³ cells/mm ³)	20.7	5.0-14.1
Neutrophils (%)	02	58-85
Lymphocyte (%)	94	8-21
Monocytes (%)	01	2-10
Eosinophils (%)	03	0-9
Basophils (%)	00	0-1
Platelets (lakhs/mm ³)	0.26	2.11-6.21
Biochemical parameters		
Total protein (g/dl)	5.8	5.4-7.5
Albumin (g/dl)	3.8	2.3-3.1
Total bilirubin (mg/dl)	0.97	0-0.3
Direct bilirubin	0.2	0-0.2
Indirect bilirubin	0.77	0-0.1
SGPT (U/L)	730.7	10-109
SGOT (U/L)	889.6	13-15
BUN (mg/dl)	43.8	8-28
Creatinine (mg/dl)	1.33	0.5-1.7

Parasitological examination

For the parasitological examination, prepared thin blood smear was stained with Giemsa stain after methanol fixation as described by Soulsby, 1982^[14] and carefully examined under high magnification of microscope for presence of haemoparasites. The smear examination demonstrated the presence of *Ehrlichia canis* morulae within monocytes under high power microscope, confirming a case of canine monocytic ehrlichiosis (CME) because no any other concurrent haemoprotozoans parasites were observed during microscopic examination.

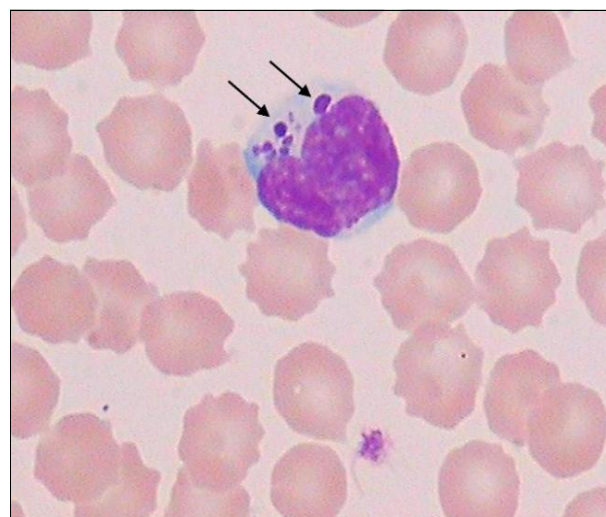


Fig 2. Giemsa-stained blood smear from affected dog showing morulae of *Ehrlichia canis* (arrow) in monocytes under high magnification (x 1000).

Treatment of infected dog

After analysing the clinical sings, laboratory findings, the presented dog was confirmed as the case of canine monocytic ehrlichiosis, caused by *Ehrlichia canis* and then the dog was treated with doxycycline 300 mg (½ tablet orally twice daily) for 30 days with supportive therapy of hemostatic (Tab. Ethamsylate 500 mg, 1 tablet twice daily for 5 days), hepatoprotective agents (Tab. Lisybin Large, 1 tablet once daily for 1 month and Tab. Hepa-20, 1 tablet once daily for 10 days), antiemetics (Ondahat Oral Spray, 8 oral pumps twice

daily on empty stomach for 5 days), hematinics (Syrup Imulat, 10 ml twice daily for 1 month and Syrup ARBC Pet, 5 ml twice daily for 1 month), immunomodulators (Tab. Wysolone (Prednisolone) 20 mg, 1 tablet twice daily for 5 days followed by 1 tablet once daily for another 5 days) and gastric protectants (Tab. Pantosec 20 mg, 1 tablet twice daily on empty stomach for 15 days). The treated dog showing the clinical improvement within the first week of therapy. The fever subsided, vomiting ceased, appetite gradually returned to normal and haemorrhagic manifestations (epistaxis and melena) was resolved. The peripheral lymph nodes regressed in size and the dog gradually regained the normal activity levels. The treated dog exhibited complete clinical recovery after 15 days of treatment and no parasitaemia was observed on blood smear examination. The dog completed a 30-days oral doxycycline regimen therapy with supportive therapy and recovered successfully without further complications.

Discussion and Conclusion

In the present study, presented dog was confirmed to be suffering from *Ehrlichia canis* as the microscopic examination of blood smear revealed morulae inside the monocytes. This disease is called canine monocytic ehrlichiosis or tropical canine pancytopenia due to cell tropism of the parasite to host haemopoietic cells that may results in thrombocytopaenia. The clinical manifestations observation of present case was similar with the findings of several other reports [15-17]. The haemato-biochemical examination showed the marked anaemia, thrombocytopenia, leukocytosis, lymphocytosis with elevated hepatic enzymes. These values were in accordance with the several earlier studies who reported anaemia, thrombocytopaenia in the canine monocytic ehrlichiosis [15-16, 18-20]. The prevalence *E. canis* infection has been reported by various researcher from different parts of India [6, 18, 21-23] and these based on microscopy as cost effective but serology and PCR test are more accurate and sensitive particularly in subclinical cases [24]. The *E. canis* infected dog responses very effective and rapidly to the doxycycline with supportive therapy in accordance with the previous findings [15-16, 19-20, 25].

In summary, the most common clinical feature of CME is marked anaemia, thrombocytopaenia, lymphadenopathy and pyrexia. The presence of morulae inside the monocytes are confirmatory microscopic diagnosis of *E. canis* infection in dog. Doxycycline with supportive therapy acts as effective treatment regimen for complete clearance of *E. canis* infection from the infected dog. As it is tick-borne disease and has public health implication, the prompt and advance diagnosis, continuous surveillance and public awareness on tick transmission and control are essential necessity to check the disease spread and mitigate the public health hazard.

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Conflict of Interest: The authors declare that there is no conflict of interest.

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