Therapeutic management of canine ehrlichiosis with aid of blood transfusion: a case report

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Abstract An adult female Labrador Retriever dog was presented at referral veterinary polyclinic, IVRI in lateral recumbency with history of anorexia, high fever, severe panting, heavy tick infestation, and not responding to cephalosporins and fluoroquinolones since last 1 week. Clinical examination showed pale conjunctiva, enlarged popliteal lymph node however, electrocardiogram (ECG) report found to be normal. Haematological finding showed marked anaemia and thrombocytopenia. Parasitological examination found it to be positive for *Ehrlichia canis* and confirmed ticks to be *Rhipicephalus sanguineus*. Dog was treated with doxycycline @ 10 mg/kg for 28 days in divided dose with supportive therapy. Blood transfusion was done on second day to avoid complication. Dog showed marked recovery after 15 days and re-examination of blood revealed no parasitemia.

Keywords *Ehrlichia canis* · Dog · *Rhipicephalus sanguineus* · Thrombocytopenia · Doxycycline

Introduction

Canine ehrlichiosis also known as tropical pancytopenia and canine monocytic ehrlichiosis (CME), is a highly fatal tick borne disease caused by *Ehrlichia canis* (order

Rickettsiales, family Anaplasmataceae) and is highly prevalent in tropical and subtropical areas including India (Singla et al. 2011). It is a gram negative, obligatory intracellular rickettsial organism (Unver et al. 2006). *E. canis* is the most common amongst presently known *Ehrlichia* species responsible for clinical condition in dogs. Its distribution depends upon the epidemiology of principal vector, *Rhipicephalus sanguineus* (brown dog tick) which transtadially transmitting disease to its canine host (Johnson et al. 1998). Life cycle consists of three intracellular phase, viz. initial bodies, morulae (aggregate of initial bodies) and elementary body. Clinical diagnosis of disease condition is mainly based on identification of intracytoplasmic morulae stage. Dog, red fox, coyote and golden jackal are important reservoir of infection in nature (Neer 1998). Disease distribution showed seasonal variation with greater incidence rate in warmer seasons.

Based on clinical manifestations this disease having three phases viz. acute, subclinical and chronic. Incubation period of disease ranges from 8 to 20 days. Acute infection is manifested by clinical signs such as anorexia, high fever, dyspnoea, depression, lymphadenopathy and reduced body weight with laboratory findings of leucopenia, thrombocytopenia and hypergammaglobulinemia. Acute illness is followed by long duration subclinical and chronic phases with recurrent clinical symptoms such as pancytopenia, hemorrhage, secondary bacterial infection and continuous weight loss (Buhles et al. 1974). Chemotherapeutic agents ranging from sulphonamides to imidocarb dipropionate have been used with variable rate of success, however, 28 day regimen of doxycycline found to be most acceptable globally inspite of reports of persistent carrier status of dog (Iqbal and Rikihisa 1994).

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Materials and methods

Clinical history

An adult female Labrador Retriever dog of two and half years age was presented at Referral Veterinary Polyclinic, IVRI, Izatnagar (U.P) in lateral recumbency with history of anorexia, high fever, severe panting, heavy tick infestation, not responding to cefotaxime and ofloxacin since last 1 week. Dog when forced to walk showed staggering gait indicating immense weakness. There was history of regular deworming with fenbendazole and complete vaccination status.

Clinical examination

Dog was found to be having normal rectal temperature (101.7 °F), pale mucous membrane, increased respiratory rate, tick infestation and enlarged popliteal lymph node. The heart functioning of dog was found to be normal by electrocardiogram (ECG) report. The blood sample was collected for haematological examination. Blood smear, ticks and faecal swab were sent to Division of Parasitology, I.V.R.I for parasitological examination.

Haematological examination

The results of haematological examination along with their standard value are compiled in Table 1. From the results it was interpreted that dog was suffering from microcytic hypochromic anaemia, severe thrombocytopenia and jaundice. Elevated level of liver enzymes indicates hepatic disturbances which probably resulted in increased blood urea nitrogen (BUN) values.

Parasitological examination

In faecal examination, no parasitic eggs were observed confirming regular deworming schedule. Thin blood smear examination after Giemsa's staining showed that dog was positive for *E. canis* with leucocytes showing morula stage (Fig. 1). Further the entomological reports confirmed the ticks as *Rhipicephalus sanguineus*, brown dog tick and the principal vector of *Babesia canis* and *E. canis*. The slide was checked for any concurrent infection with other haemoprotezoans but no piroplasm form was observed.

Treatment

Dog was confirmed to be suffering from canine ehrlichiosis resulting in tropical pancytopenia and severe anaemia. Immediately after diagnosis 28 days oral doxycycline

Table 1 Haematological parameters of dog suffering from ehrlichiosis

Blood parameters	Values	Reference standard
Hb (g %)	5.5	12–19
TEC (million/cmm)	3.16	5–7.9
TLC (thousand/cmm)	11.4	5–14.1
Neutrophils (%)	75	58–85
Lymphocyte (%)	20	8–21
Eosinophil (%)	5	0–9
PCV (%)	13.9	35–57
MCV (fL)	44.0	66–77
MCH (pg)	17.0	21–26.2
MCHC (g/dl)	39.5	32–36.3
Platelet count (lakhs/cmm)	0.59	2.11–6.21
Serum creatinine (mg/dl)	0.9	0.5–1.7
BUN (mg/dl)	36.4	8–28
SGPT (IU/l)	158	10–109
SGOT (IU/l)	107	13–15
Serum bilirubin (mg/dl)		
Total	4.9	
Direct	4.1	
Indirect	0.8

Fig. 1 Giemsa stained blood smear showing morula of *E. canis* in monocyte of dog under oil immersion ($\times 1000$)

regimen was started @ 10 mg/kg in divided dose along with supportive therapy. Blood transfusion (140 ml) was performed on the second day to avoid any complication. Dog started showing recovery 15 days after treatment and re-examination of blood after 15 days did not reveal any parasitaemia.

Result and discussion

Dog was confirmed to be suffering from *E. canis*. This disease is also invariably referred as tropical canine pancytopenia due to affinity of the parasite to haematopoietic cells of the body that results in leucopenia and thrombocytopenia. In India *E. canis* infection has been reported from different part of country by varied prevalence rate (Harikrishnan et al. 2009; Dhankar et al. 2011; Lakshmanan et al. 2011; Singla et al. 2011; Das and Konar 2013; Bhadesiya and Raval 2015). In the present study, microscopic examination of blood smear revealed the presence of *E. canis* in the dog. The haematological examination showed marked anaemia, decreased erythrocyte and packed cell volume so blood transfusion was advised for animal survival. These values were in accordance to Das and Konar (2013) who studied and reported anemia and thrombocytopenia in canine ehrlichiosis.

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