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Clinical management of *E. Canis* along with whole blood transfusion in Dalmatian dog

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Abstract

Canine ehrlichiosis is an important and potentially life threatening disease in India caused by *E. canis*. Canine ehrlichiosis was diagnosed in a Dalmatian dog based on clinical symptoms, Haemato-biochemical findings and cytological evidence of *Ehrlichia canis* in freshly prepared blood smears. In the present study the Hemato-biochemical alterations were observed. It was observed that total erythrocyte count (TEC), hemoglobin (Hb), packed cell volume and platelet count were reduced and increase was reported in alanine transaminase (ALT), aspartate transaminase (AST). The dog was treated with Imidocarb and supportive therapy. The whole blood transfusion was done due to severe anemia. The dog was administered with 150 ml of whole blood and post blood transfusion Haemato-biochemical values showed marked improvement.

Keywords: *Ehrlichia canis*, anemia, blood transfusion, Imidocarb

Introduction

Ehrlichiosis is an important tick borne protozoan disease in canine caused by *Ehrlichia canis*. Exposure of canines to different ectoparasites are mainly due to improper housing, management and grooming practices [1]. One of the major reasons for the occurrence of *E. Canis* in canine population is the presence of tick vector, *Rhipicephalus sanguineus* sensulato, which is common in rural and urban areas in tropical and subtropical areas of the world [2, 3, 4, 5]. Canine ehrlichiosis has been reported as a very commonly occurring diseases in dogs from subtropical and tropical areas of the world [6]. Disease is mainly divided into acute, subclinical and chronic phases, each accompanies with alteration in Hematological parameters with severe weight loss and other related symptoms leading to anaemia. Ettinger and Feldman, (2010) [7] reported that thrombocytopenia, leucopenia with bleeding tendencies is most consistently present in dog with both acute and chronic stages of disease. However, in naturally occurring infections, accurate phase of the disease could be difficult to diagnose, because the sub-clinical phase may last for years without any apparent clinical signs [8]. *E. canis* perpetually develops anaemia [9]. In anaemia the oxygen carrying capacity of blood is decreased and oxygenation of tissue is very important to support life [10]. The goal of Anemia therapy is to improve oxygen delivery to tissues. If not treated, hypoxemia can cause a cascade of reactions that will eventually lead to cell death [11]. Transfusion therapy is an important tool that can improve the patient's capability to overcome diseases [12]. Whole blood is mainly indicated for fluid substitution in severe anaemia with large blood loss.

Case history and clinical observations

A Dalmatian dog of 52 days of age was presented to the Department of Veterinary Medicine, College of Veterinary Sciences & AH, Kanke Ranchi with a history of weakness, anorexia, vomition and weight loss. Pale visible mucous-membrane, dehydration, lethargy, high rise of temperature, increased respiratory rate and enlarged superficial lymph nodes were observed on clinical examination with presence of ticks on body surface. Blood samples were collected and subjected for routine haematological and biochemical examination. Haematological parameters including haemoglobin (Hb, g/ dl), packed cell volume (PCV %), total erythrocyte count (TEC, millions/u1), total leukocyte count (TLC), differential leukocyte count (DLC %)

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and platelet (thousands/u1) were estimated using standard procedure on day 0, 1, 3 and 7. Blood smear was also made for subject to direct microscopic examination from Giemsa stain for hemoprotozoan parasite investigation. Biochemical parameters alanine transaminase (ALT), aspartate transaminase (AST) and total protein were also estimated. On first day, hemogram depicted haemoglobin 3gm%, PCV 9.14 %, TEC- $1.47 \times 10^6/\mu\text{l}$, TLC $24.79 \times 10^3/\mu\text{l}$ and biochemical values were ALT 310.2 IU/L, AST 260 IU/L, total protein 6.7. Parasitological examination of stool confirmed the absence of any form of parasites and their life cycle stages. Based on tick history, clinical findings and microscopic examination, the case was diagnosed as canine ehrlichiosis (Fig 1).

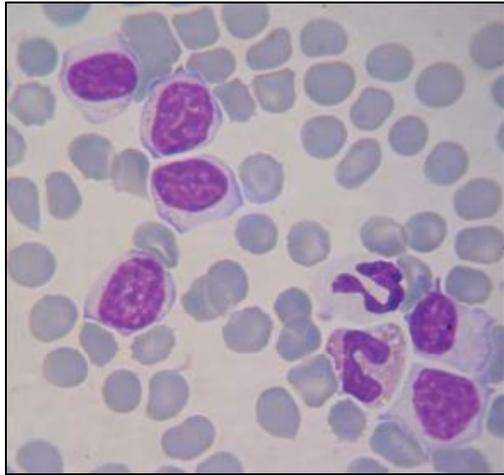


Fig 1: Blood smear examination indicating presence of *E. canis* on blood cells

Treatment and Discussion:

The dog was treated with Imidocarb injection @ 1ml/20 kg body weight s/c once and vitamin B complex @ 1ml/40kg i/m along with iron preparation @ 10-20mg/kg i/m daily for 5 days. Since clinical signs and hematological parameters suggested anemia, immediate whole blood transfusion was done on the first day as emergency treatment. For blood transfusion a healthy Labrador dog (22 Kg b.wt.) was selected as donor and detailed hematological indices were estimated and blood smear examination for hemoprotozoa was also carried out. Major and minor cross matching of donor and recipient was done according to the method of Lanevski and Wardrop (2001) [13]. The volume of required blood was calculated on the basis of formula given by Sackmen (1998) [14]. After calculation 150ml of blood was collected from jugular vein in citrate-phosphate-dextrose-adenine bag and blood transfusion was done on emergency as per standard procedure (Fig 2). Post blood transfusion, the animal showed recovery with the subsequent treatment (Fig 3). Haemato-biochemical values showed marked improvement (Table 1).



Fig 2: Pup undergoing blood transfusion

Table 1: Haemato-biochemical values of the dog

	0 day	1 day	3 day	7 day
Hemoglobin(g/dl)	3	6.1	7.6	10.2
PCV(%)	9.14	12.2	18.3	31.4
Platelet count($10^3/\mu\text{l}$)	188	192.2	200.4	212
Erythrocyte count($10^6/\mu\text{l}$)	1.47	4.57	6.04	7.67
TLC($10^3/\mu\text{l}$)	24.79	26.2	28.3	29.1
Lymphocytes (%)	60.08	57.3	49.3	37.2
Monocytes (%)	0.6	1.2	1.7	2.3
Neutrophils (%)	30.9	38.7	47.2	57.9
Eosinophils (%)	0.5	0.5	1.2	1
Basophils (%)	0	0	0	0
AST(IU/l)	260	242.1	183.1	106
ALT(IU/l)	310.2	251.3	182.4	132.1
Total protein	6.7	6.8	7.2	7.01



Fig 3: Pup after treatment

The clinical symptoms observed in this study were fever, anorexia, dullness, hemoglobinuria, pale mucous membrane and swollen submandibular lymph nodes which was also reported by Islam *et al.*, (2017) [15] & Sharma *et al.*, (2010) [16]. The values of Hb, PCV, TEC, TLC, and total platelet count were significantly decreased in dog which came to normal after treatment (Table 1). The same has been observed by Bhadesiya and Modi, 2015 [1]. Lymphocyte and Eosinophil were increased which may be due to alteration in hemostasis as well as parasite involvement, which elucidate immune responses and hence overproduction of lymphocytes and monocytes [17]. As lymphocytes exert a cytotoxic effect upon autologous monocytes there were a decrease in neutrophils and monocytes which increased after treatment [18]. Platelets dysfunction (thrombocytopenia) have occurred, due to formation of antiplatelet antibodies which is also explained by Smitha *et al.*, (2002) [19], Shekhar *et al.*, (2011) [20] and Harrus *et al.* (2011) [21]. Increase in serum protein along with elevated ALT and AST are frequent in dogs in Ehrlichiosis [7]. A similar study by Sasanalli *et al.*, (2009) [22] and Kottadamane *et al.*, (2017) [23] suggested that there was an increase in ALT and AST. There are currently no alternative oxygen-carrier products, such as free hemoglobin, available for veterinary use. So dogs with transfusions achieve higher PCVs and had

better oxygen-carrying capacity to overcome the underlying disease [12]. After the treatment all parameters came to their normal values with complete cessation of all clinical signs. Thus, blood transfusion along with Imidocarb treatment to affected dogs found best by decreasing the severity and favoring early recovery of dog.

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