Short Communication

Successful Therapeutic Management of Two Critical Cases of Canine Monocytic Ehrlichiosis

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Abstract

Canine Monocytic Ehrlichiosis(CME) is a fatal tick borne disease caused by Ehrlichia canis, transmitted by the tick, Rhipicephalus sanguineus. Epistaxis, petechial hemorrhage, hematuria, fever, thrombocytopenia and anemia are some important clinico-pathological findings of this disease. Two dogs (one Labrador and another German Shepherd) were presented to TVCC with above mentioned clinical symptoms. Examination of blood parameters revealed anemia and thrombocytopenia. Morulae bodies were found within the monocytes in blood impression smear of labrador dog. Both the dogs were positive for E. canis by a SNAP 4Dx Plus Test Kit, which confirmed the case as CME. Whole blood transfusion was carried out in Labrador dog. Both the animals were treated with doxycycline@5mg/kg, b.i.d. along with other supportive medications. After a month of treatment, the animals showed an uneventful recovery. Thus, doxycycline therapy, whole blood transfusion along with other supportive were found useful in the management of critical cases of CME.

Key words: Anemia, Doxycycline, Ehrlichia, Thrombocytopenia, Whole Blood Transfusion

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Introduction

Among tick borne diseases in canines, Ehrlichiosis is a potentially fatal tick borne Rickettsial disease (Haritha *et al*., 2018) in tropical and sub-tropical region of India. The disease is caused by various species of *Ehrlichia* like *E. canis*, *E. ewingii*, *E. chaffensis* and *E. platys*. *Ehrlichia spp.* are mainly transmitted by two types of ticks – Brown dog tick (*Rhipicephalus sanguineus*) and Lone star tick (*Amblyoma americanum*). Three types of Canine *Ehrlichiosis* are seen- Canine Monocytic, Canine Thrombocytic and

Canine Granulocytic Ehrlichiosis (Barman *et al*., 2014). Canine Monocytic Ehrlichiosis (CME) is mainly caused by *E. canis* (Gahalot *et al*.,2017) in which the organism multiplies inside the monocytes. Several cases of canine *Ehrlichiosis* have also been reported having co-infection with either babesia spp. or hepatozoon spp. (Barman *et al*., 2014). The pathogenesis of CME involves an incubation period of 8-20 days (Lakkawar *et al*., 2003) followed by either of 3 clinical phases viz. Acute, Sub-clinical or Chronic (Skotarczak,2003, Gahalot *et al*.,2017, Kumar *et al*., 2018). The acute phase of the disease is manifested as anaemia, pyrexia, depression, inappetence, joint pain. In sub-clinical phase, the animal may show slight anaemia which may last for several months to years. The chronic phase is characterized by weight loss, neurological signs, inflammation of eye, oedema in hind limbs and fever etc. The major hematological alterations during the acute stage are thrombocytopenia, mild leukopenia, mild anaemia, during sub-clinical stage is thrombocytopenia and during chronic stage is pancytopenia (Harrus *et al*.,1999). The main biochemical alterations due to CME are hypoalbuminemia, hyperglobulinemia and hyper-gamma-globulinemia (Haritha *et al*. 2018).

This report discusses about diagnosis and therapeutic management of CME in two dogs.

Case History and Treatment

Two dogs, one 5-years male labrador dog with the complaint of reddish colour urination, anorexia, weakness and respiratory distress and another 3 ½ years male German Shepherd (GSD) dog with the complaint of severe nasal bleeding (epistaxis) (Fig.1) and anorexia were presented to Teaching Veterinary Clinical Complex, C.V.Sc. & A. H. , OUAT, Bhubaneswar.

Fig. 1: Severe epistaxis in GSD dog

Both the animal had an earlier history of tick infestation10-15 days before. In both the cases, clinical examination revealed pale mucus membrane, tachycardia, high temperature (103.6°F in Labrador and 105°F in GSD) and moderate dehydration. Complete blood counts in both the dogs revealed decreased haemoglobin concentration (3.8g/dl in labrador and 8.2g/dl in GSD), thrombocytopenia, neutrophilia and

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leucocytosis (Table 1). Serum biochemical analysis revealed increased level of Aspartate amino-transferase (AST), Alanine amino transferase (ALT) & Alkaline Phosphatase (ALP) (Table 1).

S. No.	Parameters	Labrador dog		German Shepherd dog		Reference range
		Pre-treatment	Post-treatment	Pre-treatment	Post-treatment	
1	Haemoglobin (g/dl)	3.8	10.8	8.2	14.6	11.9-18.9
2	PCV (%)	13	33	26	44	35-57
3	TEC ($\times 10^6$/µl)	1.6	4.5	3.4	6.1	4.95-7.87
4	TPC ($\times 10^3$/µl)	75	196	90	286	211-621
5	TLC ($\times 10^3$/µl)	16.7	7.4	22.4	7.3	5.0-14.1
6	Neutrophils (%)	76	63	84	61	55-65
7	Lymphocytes (%)	16	30	11	35	30-35
8	Monocytes (%)	5	2	4	1	2-8
9	Eosinophils (%)	3	4	1	3	1-4
10	Basophils (%)	0	1	0	0	0-1
11	AST (U/L)	89	29	61	26	15-30
12	ALT (U/L)	157	55	134	35	10-109
13	ALP (U/L)	180	72	142	61	1-110
14	Albumin (g/dl)	1.89	2.42	2.12	2.57	2.3-3.1
15	Globulin (g/dl)	4.82	3.67	4.1	3.99	2.5-3.8
16	Total Protein (g/dl)	6.71	6.09	6.22	6.55	5-8
17	Serum Creatinine (mg/dl)	0.95	1.25	1.53	1.02	0.5-1.7
18	BUN (mg/dl)	15.7	18.3	29.3	15.6	8-28

In the blood impression smear of labrador dog, morulae bodies (Gahalot *et al*., 2017) were found within the monocytes (Fig. 2) but no blood parasites were found in blood smear of GSD dog. Therefore, a kit test was carried out using "SNAP 4Dx Plus Test Kit (IDEXX Labs.)" by taking blood samples from both the dogs and both the samples were found positive for *Ehrlichia canis* (Fig. 3). Thus, the disease was diagnosed as Canine monocytic ehrlichiosis. After the collection of blood samples, first haemorrhage was checked by giving Tranexamic acid inj. @8mg/kg, intravenously along with fluid therapy, and to reduce body temperature antipyretic (Paracetamol @10mg/kg, IM) was given.

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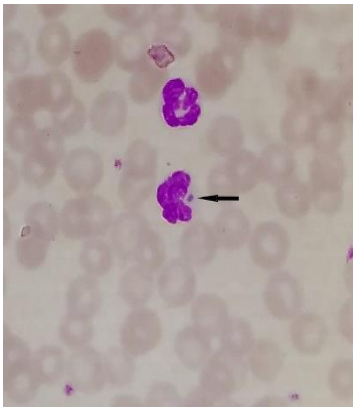

Fig. 2: Morulae bodies within monocytes (black arrow)

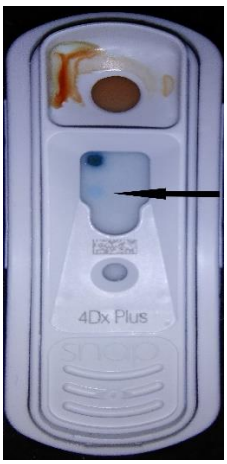

Fig. 3: SNAP 4Dx Plus Test Kit- showing positive for *Ehrlichia canis* (black arrow)

After getting all the laboratory findings and by taking necessary precautions, the labrador dog was transfused with whole blood (Fig. 4) collected from another healthy labrador dog to correct severe anemia. Pheniramine maleate inj.@0.5mg/kg and oral Prednisolone was given in tapering dose to prevent any adverse immune reaction during and after the blood-transfusion. Both the dogs were then treated with Doxycycline @5mg/kg, *b.i.d.* orally for 21 days along with other supportive therapies like oral hematinic, hepatoprotectants and ThrombBeat syrup for 1½ months. The owner was also advised to prevent tick infestation by using Fipronil spray.

Fig. 4: Whole blood transfusion to Labrador dog

Result and Discussion

In labrador dog, colour of the urine gradually changed from reddish to transparent yellow within 5 days of treatment and in GSD dog, epistaxis was controlled within 2 days of treatment with Tranexamic acid inj. Appetite comes to normal within 7days of treatment in both the animals. After 1month of treatment, blood samples were taken from both the animals, and all the above-mentioned diagnostics were carried out again

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and the entire parameters were found nearer to normal. In addition, the blood samples were found negative with the SNAP 4Dx Plus Test Kit as well as in blood impression smear. Both the dogs showed an uneventful recovery after one month of treatment with normal appetite, general improvement of the health with playful nature.

Ehrlichiosis should be suspected in dogs with pale mucus membrane, petechial haemorrhage, epistaxis and thrombocytopenia etc., with a previous history of tick infestation. Ehrlichia is an intracellular Gram -ve bacteria and has high affinity for haematopoietic cells. Thrombocytopenia, the most common haematological alteration, is the result of an increased platelet consumption due to inflammatory changes in blood vessel endothelium as well as immunologic destruction of thrombocytes (Harrus *et al*.,1999). The main clinical manifestation of CME is non-regenerative anaemia which may be due to the bleeding tendencies that results from thrombocytopenia as well as bone marrow hypoplasia (Ettinger & Feldman,2010). Elevation of ALT & AST indicates hepatic dysfunction due to the damage of liver parenchyma caused by the infiltration of perivascular mononuclear cells (Kumar *et al*., 2018).

Doxycycline inhibits attachment of aminoacyl t-RNA to the bacterial ribosomes during protein synthesis (Mylonakis *et al*., 2019), thus exhibits a bacteriostatic action. Furthermore, doxycycline also has a positive effect on the proliferation of platelets and erythroid cell corpuscular haemoglobin concentration i.e. MCH and MCHC (Villaescusa *et al*., 2015). Tranexamic Acid has an anti-fibrinolytic action, hence promotes blood coagulation and checks haemorrhage. Further, the whole blood transfusion may be carried out in the affected animal to temporarily counteract the systemic consequences of severe anaemia, as well as to increase the platelet concentration which subsequently can provide a temporary haemostatic action (Mylonakis *et al*., 2019). CME is mainly transmitted by the tick *Rhipicephalus sanguineus*. Hence, this transmission can be prevented by controlling the tick population by the use of acaricides like fipronil, amitraz or pyrethrin etc.

Conclusion

Doxycycline along with other supportive medications can be used successfully for quick recovery from CME in dogs. Whole blood transfusion is useful to correct severe anaemic condition found in this disease.

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