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Per Acute Case of *Trypanosoma evansi* in a Dobermann – A Case Report

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ABSTRACT: The salivarian trypanosome, *Trypanosoma evansi*, commonly called as surra in India causes major disease in camels, equines and dogs and in which it can often be fatal in the absence of treatment. In this manuscript a case study of trypanosome infected dog is detailed. A Female Dobermann dog of three years age was reported to a private Veterinary clinic at Proddatur, the Rayalaseema region of Andhra Pradesh, India with the clinical symptoms of pyrexia (105ºF), severe anemia and pale mucous membrane with lateral recumbency. The dog was adopted in a farm house along with few buffaloes and often fed with cooked beef. The blood was screened for hemprotozoan parasites by wet blood film (WBF) and Leishmann's staining technique and the case was confirmed as *Trypanosoma evansi* by microscopic examination. Complete blood profile was carried out manually, in which hypochromic regenerative anaemia was noticed. The animal was initially stabilized with intravenous iron sucrose infusion; soon after, single dose of diminazene aceturate (3.5mg/kg bodyweight) was administered deep intramuscularly, the dog got recovered within 24 hours of medication. This study provides a critical summary of correction of trypanosome induced regenerative anaemia with intravenous iron therapy.

Keywords: Canine Vector borne disease, Iron sucrose infusion, *Trypanosoma evansi*.

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INTRODUCTION

Trypanosoma evansi is a vector borne hemoprotozoan parasite transmitted by biting *Tabanus* and *Stomoxys* flies affecting different species of domestic and wild animals like cattle, buffalo, sheep, goat, horse, mule, donkey, camel, dog, pig, elephant, deer, fox, tiger and jackals with characteristic clinical signs of intermittent fever, anaemia, oedema of dependent parts, nervous symptoms, abortion, loss of weight and drastic production losses (Desquesnes *et al.*, 2013). Trypomastigote form of trypanosome enters host cells soon after tabanid bite, multiplies sub-clinically and evades the immune system, further spread throughout the body primarily within macrophages. Parasitaemia develops within few day and peaks 2 to 3weeks post infection, coinciding with clinical disease (Barr *et al*., 1991). Trypanosomosis is generally acute and fatal in canines (Soulsby, 1982) and a cause of fever, anemia, myocarditis and corneal opacity.

Anemia is a cardinal feature of the disease in which red blood cells are removed from the circulation by the expelled mononuclear phagocytic system. Later, infection of several months duration, when the parasitaemia become low and intermittent, anemia may resolve to a variable degree (Urquhart *et al*. 2002).

Carnivores, especially dogs, are naturally infected with *T. euansi* all over the globe, however the question of mode of transmission remains unanswered. Commonly dogs and wild canidae are protected by a thick fur coat from attacks of blood-sucking flies and they become infected by devouring the carcasses of ungulates affected by *T. evansi* (Hoare, 1972). After the clinical case report of human trypanasomiasis in India and Egypt (Haridy *et al*., 2011; Joshi *et al*., 2005), now the *T. evansi* is considered as a zoonotic and a multi-species disease by the World Animal Health Organization (OIE, 2008; Salim *et al*., 2011).

Anti-trypanosomocidal drugs like diminazene diaceturate, quinapyramine prosalt and suramin were in practice in bovine and canines. Out of which fastest reduction of trypanosomes from the peripheral circulation within the span of 24 hours was found with deep intramuscular administration of single dose of diminazene diaceturate at 3.5mg /kg body weight (Rani and Suresh 2007). It would be considered as fatal in canines, when we administer diminazene diaceturate above the dose rate of 3.5mg /kg body weight (Han *et al*., 2014). Further, up to our knowledge, we could not able to retrieve the reports in connection with the utilization intravenous iron therapy in stabilization of *T. evansi* infected dog and therefore in the present case study, we planned to use the commercially available iron sucrose infusion (Inj. Orofer- S) for treating trypanosome induced regenerative anemia along with the routine anti-trypanosome therapy.

Clinical history: A female Dobermann dog of three years age was reported to a private veterinary clinic at Proddatur, Rayalaseema region of Andhra Pradesh, India with the clinical symptoms of subnormal rectal temperature (99º F), pale mucous membrane with severe anemia and lateral recumbency. The pet was kept within the premises of a farm house along with buffaloes and it was fed offenly with cooked beef. The past history revealed that the Dobermann was suffered with the transient pyrexia (105 to 106.5ºF) and in-appetence for six days and treated with two doses cefotaxime and meloxicam, however did not respond to the therapy.

MATERIAL AND METHODS

The reported dog was tested for the presence of haemoprotozoan parasites through blood smear examination. Initially, a drop of peripheral blood was collected from ear vein and wet blood film (WBF) examination was carried out for the detection of microfilaria and *Trypanosoma* sp. Further, thin blood smear was made in a clean glass slide, air-dried and the smear was stained with the Leishman's stain (Coles 1986), later examined under oil immersion objective (x100). Complete blood profile viz. hemoglobulin (Hb), Packed cell volume (PCV), Total erythrocyte Count (TEC), Total leukocyte count (TLC) and Differential leukocyte count (DLC) was performed manually as per the standard protocol (Beverly *et al*., 2003).

Treatment: The requirement of iron for stabilizing the reported anemic dog was calculated by using the formula as described by Silverstein and Rodgers (2004) with minor modification.

Required iron dose (mg) = Hb% deficit (Normal reference range of Hb in canine - Actual Hb concentration) X 150 + 500 (150: Intravenous administration of 150 mg of Iron is required to raise the Hb% by 1gm %) (500: Iron required to replenish the iron stores is 500mg).

The Hb concentration reported in the *T. evansi* infected Dobermann was 6.8 g/dL and the required dose of iron as per the formula was 1280 mg. Initial dose of 300 mg of iron sucrose dissolved in 100 ml normal saline was administered over a period of 30 minutes. Further, the total dose of 1280mg iron was administered in four divided doses in weekly interval.

After an hour of iron sucrose administration, diminazine aceturate (3.5 mg/kg body weight) was administered through deep intramuscular route.

RESULTS

The Dobermann reported with the lateral recumbence was showed severe muscular emaciation with impaired eye sight, but corneal opacity was not appreciated in this case. Immediate examination of wet blood film under the microscope (10x magnification) revealed teaming of trypanosomes with vigorous moment. Further confirmation of *T. evansi* was made using Leishman's stained thin blood smear (Fig. 1). Totally ten *T. evansi* parasites were measured with micrometry technique and the size was varied from 21- 39 µm length with an average of 29 µm. Complete blood cell count by manual method revealed regenerative hypochromic anemia (Fig. 2) with relative neutrophilia (Hemoglobin: 6.8 g/dL, Total Erythrocyte Count: 3.2×10^6/uL, Packed cell volume: 21.0%, Total leukocyte count: 8050/µL, Neutrophil-81%, Lymphocyte-16%, Eosinophil-2% and Monocyte-1%). The blood smear was found negative for *Ehrlichia canis* and *Babesia* spp.

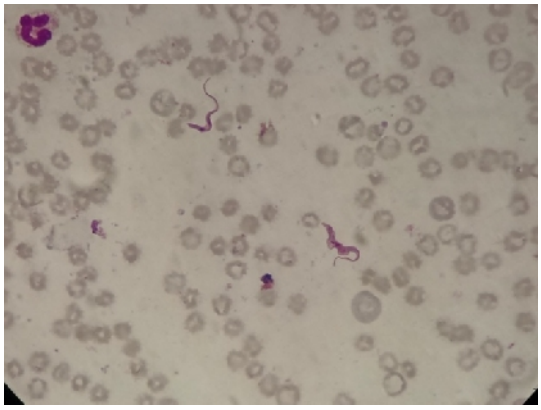

Fig. 1. Leishman's Stained Blood Smear of Dog (100x) showing *Trypanosoma evansi*.

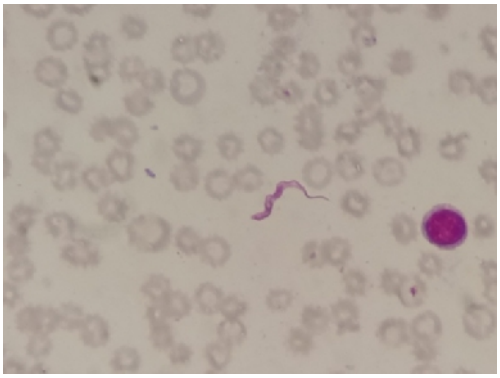

Fig. 2. Leishman's Stained Blood Smear of Dog (100x) showing *Trypanosoma evansi* and Regenerative hyphochromic anaemia (Retained nuclear material and increased central palor zone of RBC).

DISCUSSION

Subnormal temperature (99°F), Pale mucous membrane with severe anaemia, muscular emaciation and lateral recumbency was clearly indicated the terminal stage of trypanosomosis. Earlier, the pet was reported with transient pyrexia (105 to 106.5ºF), anorexia and weakness and was failed to respond to the antibiotic and supplement therapy. Confirmative diagnosis was made with Leishman's stained blood smear as *T. evansi*. The reported clinical signs of raise in body temperature and anaemia were in agreement with the findings of Nwoha *et al.,* (2013). Similarly, Thirunavukkarasu *et al.,* (2004) also observed the subnormal temperature (98ºF) and recumbency in a stray dog. Lakshmi Prasad *et al.,* (2015) also noticed the prevalence of *T. evansi* in majority of the canine breeds viz. Mongrel, Pomeranian, Crossbreeds, German Shepherd, Dobermann and Labrador available in Andhra Pradesh.

The occurrence of trypanosomiasis is commonly found in crossbred cattle and buffloes in India, the increased incidence of canine trypanosomosis could be due to the consumption of garbage contaminated with the animal offal and feeding raw beef. History of feeding cooked beef was observed in the present report and therefore there could be every possibilities of consuming garbage contaminated offal of beef within the farm premises. Similarly, the report of Nwoha *et al* (2013) depicted the regular occurrence of *T. evansi* in dogs, which acts as a sentinel animals as observed in the surroundings of slaughter houses, they can acquire the infection when eating fresh raw meat from infected animal. In accordance with the present case report, the findings of Raina *et al.,* (1985); Uilenberg (1998) also exposed that the majority of dogs attain the trypanosome infection by consuming fresh animal carcasses that died recently from trypanosomosis. Similarly, Adams and Lionnet (1983) were also observed the transmission of *T. evanis*i to dogs after eating the infected meat. Further, the dogs kept mainly in an area with a considerable population of dairy cattle were also prone for picking up the trypanosome infection from cattle (Singh *et al.* 1993) through vector transmission.

Up to our acquaintance, none of the reports depicted the use of parenteral iron sucrose in treating regenerative hypochromic anemia in canines infected with trypanosomosis. However, Dinaz *et al*., (2012) successfully utilized iron sucrose infusion in canines suffered with normocytic hypochromic anaemia. Although there are number of effective trypanosomacidal agents in practice for treating canine trypanosomosis, viz. suramin, quinapyramine and diminazene diaceturate, single dose of diminazene (3.5mg/kg) was effectively utilized in this study for eliminating the acute case of trypanosomosis in a Dobermann. Similar results were observed by Rani and Suresh (2007) who treated trypanosomiasis in Pomeranian dog with a single dose of diminazeneaceturate (3.5mg/kg body weight) for the eradication of circulating trypanosomes within 48 hours of medication. Over all, the diminazene aceturate, above the dose rate of 3.5mg/kg was found to be highly fatal for canidae family. Likewise when Rjeibi *et al.,* (2015) treated a dog with intramuscular diminazene aceturate at 5 mg/kg, the animal was collapsed 2 weeks later and the necropsy revealed cachexia, severe anaemia, subcutaneous edema, acute interstitial hepatitis and nephritis.

CONCLUSION

Severe to moderate reduction in TEC, PCV, Hb and TLC values with marginal neutrophilia, relative lymphocytopenia and hypochromic anaemia was the common findings of canine trypanosomosis, however the differential diagnosis of occurrence of similar haemogram in other blood protozoan diseases is mandatory. It is recommended to stable the trypanosomosis infected anemic dog with intravenous iron sucrose therapy before the administration of diminazine aceturate. Further, diminazine aceturate is strictly dose specific in canidae family and lethal to exceed 3.5mg/kg body weight. Concomitantly, the dose of diminazine can be extended up to 7.0 mg/kg to other cloven footed animals by deep intramuscular route.

FUTURE SCOPE

Diagnosis of blood protozoan diseases in the phase of recumbency and subnormal temperature will always yield poor prognosis and therefore stabilization of animal from anaemia and anoxia is the major goal in treatment of blood protozoan diseases of livestock and pet animals.

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CONFLICT OF INTEREST. Nil.

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