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### Haematological changes in trypanosomiasis infected buffalo and its therapeutic management

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#### Abstract

*Trypanosoma evansi* infection in buffalo has high prevalence in Indian subcontinent. In the present case a female buffalo with typical signs of haemoprotozoal infection like anaemia, intermittent fever, anorexia, weight loss and dullness were presented. The microscopic blood smear examination detected severe infection with extra-erythrocytic *Trypanosoma* organism. Haematology revealed anaemia, neutrophilia, lymphocytopenia, eosinophilia and thrombocytopenia. The animal was treated with Diminazene aceturate which resulted in complete clinical recovery after 14 days.

**Keywords:** Buffalo, *Trypanosoma*, Intermittent fever, Anaemia, Diminazene aceturate

#### Introduction

Trypanosomiasis (Surra) caused by the haemo-flagellate protozoan *Trypanosoma evansi* is known to affect many species like equines, camels, dogs, cattle and buffaloes including humans. It is the most common and widespread trypanosome of cattles in India, while there have also been a few rare cases of *T. theileri* (Sood *et al.*, 2011 and Da Silva *et al.*, 2013) [10, 3]. *T. evansi* is found to be transmitted in several ways by biting flies, sucking flies, and vampire bats; transmission can be vertical or horizontal, iatrogenic, and through ingestion depending on the season, region, and the host species Desquesnes *et al.* (2013) [4]. Clinical signs and symptoms include pyrexia, anorexia, anemia-related debility, frequent urination and defaecation, dyspnea, irritability, circular motion, intense exhaustion, enlarged lymph nodes, and sore muscles and joints. In acute cases death might occur in two to three days, but in chronic condition oedema in the chest and legs as well as keratitis development have been reported in about thirty days. The current report focuses on the treatment of *T. evansi*-caused

Trypanosomiasis in a buffalo.

#### History and clinical observations

A five years old female water buffalo (Fig.1) revealed a week-long history of decreased milk production, depression, and anorexia. It suffered chronic weight loss and intermittent fever (temperature reaching up to 103 °F). Clinical examination revealed anaemia, enlarged lymph node, congested conjunctival and vulvar mucous membrane.

#### Diagnosis

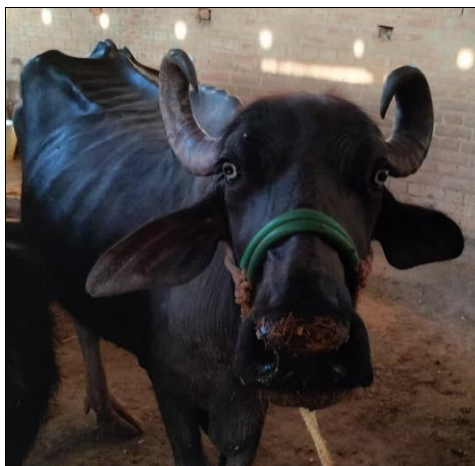
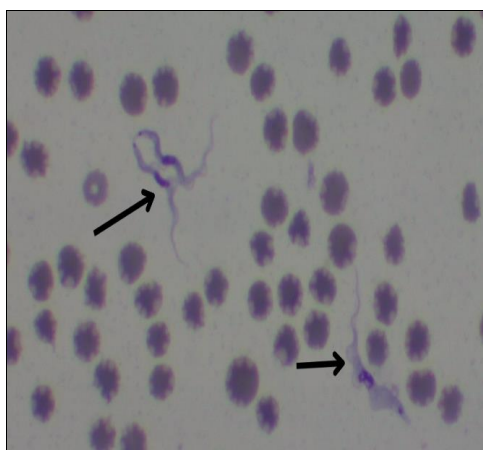
Whole blood was collected in EDTA vial for haematology and blood smear examination. The haematological findings are depicted in table no-1. Giemsa stain was used to stain the peripheral blood smear, which was then viewed under a light microscope with an oil immersion objective (100x). A microscopic analysis revealed the *Trypanosoma* organism present outside the red blood cells (fig 2). On the basis of clinical findings and blood smear examination the case was diagnosed to be severely affected with Trypanosomiasis.

**Table 1:** Haematology of infected buffalo

	Haematological parameters	Infected Buffalo	Reference interval
1.	Haemoglobin	5.3 g/dL	8-15 g/dL
2.	Red Blood Cell count	$3 \times 10^6 / \mu\text{L}$	$5-10 \times 10^6 / \mu\text{L}$
3.	Packed Cell Volume	18%	26-46%
4.	Mean Corpuscular Volume	47.1 fL	40-60 fL
5.	Mean Corpuscular Haemoglobin Concentration	32.1 g/dL	30-36 g/dL
6.	Mean Corpuscular Haemoglobin	15.1 pg	11-17 pg
7.	Platelets count	$0.45 \times 10^6 / \mu\text{L}$	$2-6.5 \times 10^6 / \mu\text{L}$
8.	Total Leucocyte Count	$3.3 \times 10^3 / \mu\text{L}$	$4-12 \times 10^3 / \mu\text{L}$
9.	Differential Leucocyte Count		
	Neutrophils	41.9%	25-30%
	Lymphocytes	45.5%	60-65%
	Monocytes	0.3%	5-7%
	Eosinophils	12.3%	2-5%
	Basophils	0.0%	0-1%

### Materials and Methods

The animal was treated with single dose of inj. long acting oxytetracycline @ 20mg/kg B.Wt. IM, two doses of inj. Diminazene aceturate @ 3.5 mg/kg deep intramuscularly at alternative days. Supportive treatments include inj. rumeric 10 ml/day IM for five days, inj. Flunixin meglumine @ 1.1 mg/kg IM for three days, oral hematinic and liver support daily for 10 days. After 7 days the animal started feeding. After 14 days of treatment complete clinical recovery was seen and the organisms in the peripheral blood smear disappeared.

**Fig 1:** Emaciated buffalo**Fig 2:** Arrows indicating *Trypanosoma evansi*

### Results and Discussion

The Trypanosomiasis affected buffalo in present case showed anorexia, intermittent fever, progressive anaemia, weakness, drop in milk production, weight loss and congested mucus membrane. Similar clinical findings were also reported by Sunandhadevi *et al.* (2022) <sup>[11]</sup>. Reduction in milk production is one of the signs of chronic infection in the animal (Mekata H *et al.*, 2013) <sup>[7]</sup>. The haemoglobin concentration, Total Erythrocyte Count and Packed cell volume were markedly lowered while MCV, MCHC and MCH were within the normal range suggestive of normocytic normochromic anaemia. The total leucocyte count was slightly decreased with pronounced neutrophilia, eosinophilia, lymphocytopenia and monocytopenia. The haematological changes found here was in accordance with the findings of Harit *et al.* (2019) <sup>[12]</sup>. The haematological and inflammatory changes in the host body is thought to be due to utilisation of glucose and oxygen by the motile Trypanosoma organism (Sivajothi *et al.*, 2014) <sup>[9]</sup>. Thrombocytopenia was an unique finding in this case which could be inflammatory in origin or may be attributed to disseminated intravascular coagulation. Anaemia in case of trypanosomiasis is believed to be multifactorial. Traumatic injury by whipping Trypanosoma flagella, intravascular and extravascular erythrophagocytosis, hemolysis induced by hemolysins (produced by Trypanosome), lipid peroxidation lead weakening of cell membrane and increased osmotic fragility are few of the proposed reasons (Jennings, 1975 and Jenkins and Facer 1985) <sup>[6, 5]</sup>. The treatment with oxytetracycline and diminazene aceturate proved to be effective in treating trypanosomiasis as the buffalo seemed healthy and the microscopic blood smear examination gave negative result after two weeks. Treatment with diminazene acetutrate was done previously by Anosa and Kaneko (1983) <sup>[11]</sup> and Sunandhadevi *et al.* (2014) <sup>[11]</sup>.

### Conclusion

The presented case of Trypanosomiasis in buffalo exhibited typical clinical manifestations consistent with previous reports, including anorexia, fever, anaemia, weakness, reduced milk production, weight loss, and mucosal congestion. Hematological analysis indicated normocytic normochromic anaemia with pronounced neutrophilia, eosinophilia, lymphocytopenia, and monocytopenia, aligning with prior findings. Thrombocytopenia, a notable

observation, may indicate inflammatory or coagulation-related processes. Anaemia in Trypanosomiasis likely results from multiple factors, including flagellar injury, erythrophagocytosis, and hemolysis. Treatment with oxytetracycline and diminazene aceturate proved effective, as evidenced by clinical improvement and negative blood smear after two weeks, consistent with earlier successful treatments.

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