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## Trypanosomiasis in a buffalo

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### Abstract

A common parasitic disease carried by vectors is trypanosomiasis, also known as Surra. It is a hemoparasitic disease that induces adverse effects on the health and working capability of infected animals. A 5-year-old buffalo was presented at a veterinary hospital in Guntur, Andhra Pradesh, with a history of circling movements, loss of appetite, pressing of the head against the manger and swelling of the forelimbs. Upon clinical examination, the buffalo exhibits a temperature of 106°F with a pale conjunctival mucous membrane. A thin blood smear stained with Giemsa stain was examined under a microscope to make the diagnosis, which showed the presence of the intercellular flagellated hemoprotozoan *Trypanosoma evansi*. Buffalo was treated with a single dose of quinapyramine sulphate and chloride (triquin) at a dose rate of 5 mg/kg body weight via the subcutaneous route, followed by supportive drugs. The clinical signs completely disappeared after five days of therapy. After five days of treatment, the animal's blood was drawn and a microscopic inspection showed no evidence of parasitemia.

**Keywords:** Trypanosomiasis, Giemsa stain, *Trypanosoma evansi*, Parasitemia

### Introduction

Trypanosomiasis is a hemoprotozoan disease entity caused by various members of *Trypanosoma* spp. It spreads to many domestic animal species, including cattle, buffaloes, camels, mules, horses, and donkeys. Trypanosomes were first discovered by Lingard in 1897 from the blood of buffaloes and later *Trypanosoma evansi* was discovered by Griffith Evans in 1980 from the blood of Indian camels and later from the blood of Indian equines (Hoare, 1972) <sup>[1]</sup>. The morphology of *Trypanosoma evansi* is distinct, with a slender form, a free flagellum, and a narrow posterior extremity. The undulating membrane of the parasite is clearly apparent and well-developed (Evum *et al.*, 2015) <sup>[2]</sup>.

In fresh wetmount smears, the parasite exhibits minimal displacements and vigorous movement within the microscope field. The parasite is always characterized as a monomorphic thin trypomastigote form in stained thin blood smears, with an approximate size of 15–33µm, a free flagellum, a thin posterior extremity, and a little subterminal kinetoplast. Certain instances of tiny, stumpy parasitic forms have also been documented, but with erratic characteristics (Hoare, 1972) <sup>[1]</sup>. Trypanosomes are mechanically transmitted by blood-sucking flies, namely those belonging to the species *Tabanus striatus*, *Stomoxys calcitrans*, *Haematobia irritans*, and *Lyperosia*. Because of their irregular feeding schedule and the short lifespan of the parasite in the vector, tabanid flies are the best candidates for host-to-host transmission (Rani *et al.*, 2015) <sup>[3]</sup>.

Nowadays, animal trypanosomiasis is thought to be the primary factor limiting livestock output in Africa, Asia, and Latin America, and its geographic range is continually changing (Desquesnes *et al.*, 2013a) <sup>[4]</sup>. The disease is predominantly prevalent in the Indian subcontinent, where the majority of epizootics have happened, especially in bovines, where the death rate can range up to 90%.

Clinical signs of trypanosomiasis include intermittent fever, anemia primarily from red blood cell hemolysis and erythrophagocytosis (Bhatia *et al.*, 2006) <sup>[5]</sup>, loss of appetite and weight, condition loss, production losses, neurological symptoms, cachexia, and death with or without unusual signs specific to the host species (Gardiner and Mahmoud, 1990) <sup>[6]</sup> and sometimes abortions. Trypanosomiasis is being treated with a variety of chemical substances. These include quinapyramine sulphate (curative), quinapyramine chloride (prophylactic), diminazene aceturate, isometamidium chloride, suramin, and cystelarsan.

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### Case History and Observations

A 5-year-old buffalo was brought to a veterinary hospital in Guntur, Andhra Pradesh with the symptoms of circling movements, loss of appetite, pressing of the head against the manger and oedema of the forelimbs. Upon clinical examination the buffalo exhibits a temperature of 106°F with a pale conjunctival mucous membrane. Based on its clinical history, we suspected the animal of having a *Trypanosoma evansi* infection.

### Materials and Methods

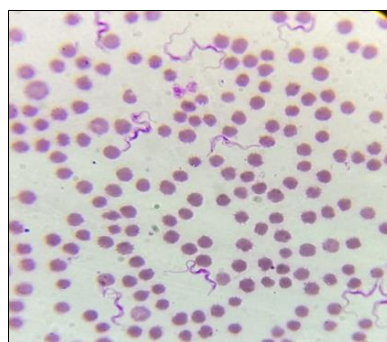
The blood was collected in an EDTA vial for studying the complete blood picture (CBP). Giemsa stain was used in the thin blood smear method to examine the blood sample (Bhatia *et al.*, 2004) [7]. The prepared blood smear was thoroughly checked for the presence of organisms using an oil immersion microscope.

EDTA-mixed blood samples were analyzed for the study of Hemoglobin, Packed Cell Volume, Total Erythrocyte Count, Total Leucocyte Count, Differential Leucocyte Count, Mean

Corpuscular Volume, Mean Corpuscular Hemoglobin, Mean Corpuscular Hemoglobin Concentration by using automatic hematological analyser.

**Table 1:** Hematological findings of infected buffalo

S. No	Hematology	Infected Buffalo	Reference range
1.	Hemoglobin (g/dl)	5.9	8-15
2.	Packed Cell Volume (%)	20.4	26-46
3.	Total erythrocyte count (x 10 <sup>6</sup> /μl)	4.1	5.0-10.0
4.	Total Leucocyte Count (x 10 <sup>3</sup> /μl)	6.8	4.0-12.0
5.	Differential Leucocyte Count (%)		
	Neutrophils	51	25-30
	Eosinophils	3	2-5
	Basophils	1	0-1
	Lymphocyte	43	60-65
	Monocytes	2	5-7
6.	Mean Corpuscular Volume (fl)	49.8	40-60
7.	Mean Corpuscular Hemoglobin (pg)	13.9	11-17
8.	Mean Corpuscular Hemoglobin Concentration (gm %)	33.5	30-36



*Trypanosoma evansi* (40x)



*Trypanosoma evansi* (100x)

**Fig 1:** Microscopic examination of blood smear: *Trypanosoma evansi*

### Results and Discussion

The microscopic examination revealed the presence of long slender trypanosomes with a free flagellum and a well-developed undulating membrane consistent with *Trypanosoma evansi* (Fig. 1). A decrease in total erythrocytic count and hemoglobin (Table 1) was noted in the current study when compared to the reference value. These results were in accordance with Kumar *et al.*, 2012 [8], Rakesh Kumar *et al.*, 2015 [9] and Chandratre *et al.*, 2019 [10]. Normocytic normochromic anemia was found by hematological examination. Additionally, lymphocytopenia and neutrophilia in the blood profile indicating degenerative shift to left. Similar findings were observed by Harit *et al.*, 2019 [11] and Chandratre *et al.*, 2019 [10].

Buffalo was treated with a single dose of quinapyramine sulphate and chloride (triquin) at 5mg/kg body weight subcutaneously along with Meloxicam at 0.5mg/kg body weight, Tribivet 10ml intramuscularly and iron sorbitol (ferritas) was given at a dose rate of 1ml/50kg body weight. As a supportive treatment, fluid therapy was given with dextrose 20% intravenously to reduce weakness. Meloxicam and iron sorbitol were repeated for 5 consecutive days along with fluid therapy. Blood from the animal was taken after 5 days of treatment and microscopic examination revealed no signs of parasitemia. The use of quinapyramine sulphate and chloride (triquin) has shown a significant effect in reducing the disease condition, by eliminating the trypanosomes. The results were in accordance with Bal *et al.*, 2014 [12], Evum *et*

*al.*, 2015 [2], Srinivasulu, 2011 [13] and Bhonsle *et al.*, 2005 [14] who studied the efficacy of different drugs in bovine trypanosomes. The use of iron sorbital injection has an encouraging effect on increasing the hemoglobin values i.e., 10.2 g/dl. The results were in correlation with Sarma *et al.*, 2008 [15]. The use of meloxicam has proved to be helpful in reducing the body temperature and the induction of vitamin B complex (Tribivet) along with fluid therapy (dextrose 20%) helped to better the body condition and regain normal appetite (Kumar *et al.*, 2010) [16].

### Conclusion

The livestock sector in India is the backbone of the agriculture sector. Dairy animals especially buffaloes are known as the best source of income for farmers. Among the various infectious diseases that dairy animals face, blood-borne parasite issues are the main reason for their subpar milk production. Due to high morbidity, decreased milk production, abortion, infertility, and various nervous disorders that cause infected animals to die, trypanosomiasis results in significant financial losses for dairy farmers. We can reduce these losses through early detection and appropriate therapeutic management. So it is essential to take suitable measures to counter the prevention and treatment of the infected animals as early as possible.

### Conflict of Interest

Not available

**Financial Support**

Not available

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