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Anaplasmosis in Buffaloes - Clinico- Pathology and Therapeutic Management

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ABSTRACT

Anaplasma marginale infection was diagnosed in three Murrah she buffaloes by microscopic examination of blood smears. All three animals showed the clinical symptoms of high temperature, inappetence, weakness, reduced milk yield, pale mucous membranes, and labored breathing. Microscopic examination of dung samples did not reveal the presence of ova/cysts/oocysts of any parasite. Haematological studies revealed decreased haemoglobin levels, total erythrocyte count, packed cell volume and mean corpuscular haemoglobin concentration and an increase in mean corpuscular volume. The animals were treated with a combination of Imidocarb dipropionate and Oxytetracycline along with antipyretics and anti-inflammatory agents, haematinics, B - complex and liver extracts. Clinical symptoms reduced from 2nd day onwards and complete recovery was observed around 15 days post-treatment.

Key Words: *Anaplasma marginale,* Buffaloes, Imidocarb dipropionate and Oxytetracycline.

INTRODUCTION

Anaplasma marginale is an obligate intra-erythrocytic gram-negative rickettsial organism belonging to family Anaplasmatacae of the order Rickettsiales and is responsible for severe disease in cattle but the infection also occurs in zebu buffalo, bison and African antelopes (Kocan *et al*,2010). Anaplasmosis is endemic in the tropics and subtropics and causes significant economic losses. The disease is also known as gall sickness or yellow bag disease. Even though about 20 species of ticks were identified as vectors, *Rhipicephalus microplu*s is considered as the major biological vector (Aubry and Geale, 2011). Mechanical transmission occurs by injecting infested RBCs by biting flies or by contaminated fomites. Cattle husbandry practices such as dehorning, castration, vaccination and blood sampling, etc. also responsible for mechanical transmission (Vatsya *et al*, 2013).

Infection is characterized by progressive hemolytic anemia associated with reduced milk production, abortion, hyperexcitability, dullness or depression, rapid deterioration of the physical condition, brownish urine, loss of appetite, muscle tremors, constipation, pale mucous membranes and laboured breathing (Brahma *et al,* 2018). Recovered animals may act as carriers for life and are responsible for the transmission to other susceptible animals (Gurjar *et al,* 2019). Though cattle are the principle host, clinical cases of anaplasmosis in buffaloes have also been reported in different states of India like Punjab (Ashuma *et al,* 2013), Uttarakhand (Vatsya *et al*, 2013) and Telangana (Namratha and Ramesh, 2020). The present paper reports the clinical pathology of anaplasmosis in buffaloes in Andhra Pradesh and its therapeutic management.

MATERIALS AND METHODS

Blood and fecal samples of three buffaloes with around 2 to 3 lactations were brought to the Animal Disease Diagnostic Laboratory, Eluru, West Godavari District, Andhra Pradesh with a history of pyrexia 104^0 F, 103.8^0F and 105^0F respectively. Other clinical symptoms were inappetence, weakness, diarrhoea, reduced milk yield and pale mucous membranes. Dung samples received were examined by both direct smear and sedimentation methods for parasitological infection (Soulsby, 1982). Blood samples were received in EDTA containing vaccutainers. Microscopic examinations of wet blood films are done under 10X and 40 X magnifications. Thin blood smears

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are made, air-dried and stained with Geimsa satin after methanol fixation. The stained smears were examined microscopically under 100X magnification. Hematological parameters (Hemoglobin, Packed cell volume (PCV), Total Red blood cell count (RBC), White blood cell count (WBC), Mean corpuscular volume (MCV), Mean corpuscular hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC) & Platelet count) were taken on 0 days, 7th days and on 15th day using fully automatic hematology analyzer PE6800Vet.

TREATMENT

The animals were treated with Imidocarb dipropionate (Babimido, Zydus AHL) @ 3 mg/Kg BW as a single dose intramuscularly (IM), followed by Oxytetracyclin -10 mg/Kg BW for 3 days IM along with antipyretics Flunixine meglumine 2.2 mg/Kg (Megludyn, Virbac Pharma) BID for 3 days IM, haematinic preperations Iron sorbital -10 mg/Kg (Ferritas, Intas pharma) as single injection IM followed by oral haematinics (3D Red, Intas pharma) @ 50mL per day for 10 days orally, and B- complex and liver extracts (Rumrec, Virbac pharma) 10mL for 5 days IM.

RESULTS AND DISCUSSION

Fever, anemia, anorexia weakness and pale mucous membranes reported in the present study were in agreement with Vatsya *et al* (2013). Fecal samples examined were found to be devoid of any parasitic ova/ cysts/ larvae. No haemoparasites could be detected on wet blood film examination. Geimsa stained thin blood smear from all three animals revealed the presence of intra-erythrocytic dot forms of *Anaplasma marginale* organisms at the margin of stained RBCs (Fig. 1). Although nuclear-based molecular techniques are required for the diagnosis and confirmation of subclinical anaplasmosis, conventional microscopic examination like Giemsa stained thin blood smear examination is the gold standard test for the diagnosis of clinical cases of anaplasmosis (Sahukat *et al*, 2019). Hematological studies (Table 1) revealed anemia with a decrease in hemoglobin, RBC count, and PCV which is in accordance with the findings of Brahma *et al* (2018) and Vatsya *et al* (2013). Phagocytosis of the infected RBCs by activated macrophages and removal of destroyed cells by the reticuloendothelial system causes reduced RBC count (Ashuman *et al*, 2013). Indiscriminate destruction of infected and non-infected erythrocytes occurs due to antibodies produced against infected RBCs leads to immune-mediated autolysis. An increase in MCV and decrease in MCHC indicates macrocytic hypochromic regenerative anemia which in turn indicates the release of immature RBCs by the bonemarrow to meet the demand for RBCs due to the rapid destruction of RBCs (Sahukat *et al*, 2019). Clinical signs started to subside from 2nd day onwards. Improvement in blood parameters was observed on the 7th day and complete recovery of the animals was observed after 15 days of treatment. Similar trends in hematological changes were observed in *Anaplasma* infected cow by Brahma *et al* (2018) and in buffalo by Vatsya *et al* (2013). In the present study, the infected animals were treated with the combination of Imidocarb dipropionate and oxytetracyclin. Higher doses of Oxytetracycline were found to be effective by Brahma *et al* (2018) and Sharma *et al* (2020). Akhtar *et al* (2010) successfully treated *Anaplasma* infected animals with single dose and carrier state animals with two doses of imidocarb dipropionate at the dose rate of 3 mg/kg b.wt. A combination of imidocarb dipropionate and Oxytetracycline was found to be more effective against anaplasmosis by Sahukat *et al* (2019) and Gurjar *et al* (2019).

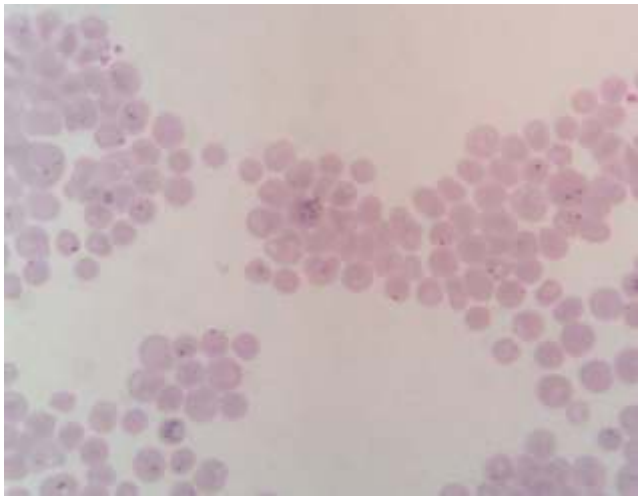

Fig.1. Blood smear showing the intraerythrocytic *Anaplasma marginale* organism at the margin of RBCs (100X)

Table 1: **Haematological changes due to anaplasmosis in buffaloes**

Sr. No	Parameter	0 day	7th day	15th day	Reference values
1.	Hemoglobin g/dL	4.3 ± 0.65	7.4 ± 0.68	11.06 ± 0.9	8 – 15.0
2.	PCV %	15.1 ± 1.8	26.9 ± 5.4	36 ± 3.5	25 – 35
3.	RBC 10*6/µL	2.02 ± 0.59	4.2 ± 0.5	5.55 ± 0.34	5 – 10
4.	WBC 10*3/ µL	4.8 ± 2.8	8 ± 1.65	10.7 ± 1.45	4 – 12
5.	MCV fL	77.4 ± 12.5	62.8 ± 5.9	60.7 ± 4.2	40 – 60
6.	MCH pg	22.2 ± 6.17	17.36 ± 1.01	20.5 ± 0.8	14 – 18
7.	MCHC g/dL	28.7 ± 4.7	28 ± 3.68	30.8 ± 2.4	30 – 36
8.	PLT 10*3 µL	131.6 ± 46	323.6 ± 90.8	273 ± 45.6	100 – 800

CONCLUSION

Anaplasmosis in buffaloes can be successfully treated with the combination of Imidocarb dipropionate and Oxytetracyclin along with antipyretics, haematinics and liver extracts. Regular screening is required in buffaloes with suspected symptoms and anaemia for the presence of *Anaplasma marginale* infection as they may act as carriers and potent sources of infection to the more susceptible cattle host.

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