

Original Research Article

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Diagnosis and Therapeutic Management of *Babesia bigemina* Infection in Cow

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ABSTRACT

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A three and half years old Jersey cow was diagnosed as infected by *Babesia bigemina* in the present communication. The infected cow had clinical manifestation of elevated temperature and anaemic appearance like pale visible mucous membrane of conjunctivae and haemoglobinuria accompanied by severe dullness and increased respiratory rate. Accordingly, representative sample of blood was collected for haemato-biochemical alteration and demonstration of haemoprotozoa microscopically. Then thin blood smear was prepared from the tip of the ear and subjected to Giemsa staining method. The stained blood smear was examined under oil immersion lens of microscope to detect haemoprotozoan parasites. Microscopic examination of the Giemsa stained blood smear revealed the very characteristic intra-erythrocytic *Babesia bigemina* organisms. The cow was treated immediately with diminazene aceturate @5 mg/kg body weight intramuscularly along with supportive therapy including intravenous infusions. Complete follow up of the case exhibited successful clinical recovery of the cow within one month.

Introduction

Bovine babesiosis, a tick-borne disease caused by intraerythrocytic hemoprotozoa *Babesia bigemina* affects the cattle in tropical and subtropical parts of Africa, Australia, America, and Asia including India. Walker and Edward (1927) first detected the disease in India. Babesiosis has clinically been characterized by high rise of body temperature,

anaemia, haemoglobinuria and in many cases death of the animals. The crossbred cattle are more vulnerable than zebu and buffaloes, which mainly act as carrier (Jithendran, 1997).

Generally the young calves up to 9-12 months of age are resistant to infection due to inverse age resistance. But the clinical symptoms of babesiosis in neonates are high fever, inability to suckling,

coffee colour urine, jaundice, and deep shallow respiration (Karunakaran *et al.*, 2011).

Materials and Methods

A three and half years old Jersey cow was presented to the Department of Veterinary Clinical Complex, Faculty of Veterinary and Animal Sciences, West Bengal University of Animal & Fishery Sciences, Mohanpur, Nadia with recumbent position accompanied by high body temperature. Depending on the clinical observations, the cow was suspected for haemoprotozoan infection. Accordingly, representative sample of blood was collected for haemato-biochemical alteration and demonstration of haemoprotozoa microscopically. Then thin blood smear was prepared from the tip of the ear and subjected to Giemsa staining method following the standard protocol (Benjamin, 1986). The stained blood smear was examined under oil immersion lens of microscope to detect haemoprotozoan parasites. Criado-Fornelio (2009) opined that the classical microscopic examination of *Babesia* piroplasms in blood smear is a gold standard test that is relatively cheap and rapid method for diagnosis of babesiosis. Treatment of infected animal was carried out and control measures were suggested to animal owner.

Results and Discussion

Clinical examination of the cow had findings like elevated body temperature, pale conjunctival mucous membrane and haemoglobinuria suggestive of severe anaemia, accompanied by severe dullness and increased respiratory rate and loss of body weight. The affected animal had history of tick infestation two weeks ago. Microscopic examination of the thin blood smears from the suspected cow showed intra-erythrocyte piroplasm stages of *Babesia bigemina*. Characteristic morphological features like round, elongated and the typical pear shape with an acute angle in the erythrocytes confirmed *Babesia bigemina* (Fig).

Affected cow revealed hypohaemoglobinaemia, erythrocytopenia, thrombocytopenia, leucocytosis,

increased activity of alanine aminotransferase (ALT) and alkaline phosphatase (ALP), elevated level of SUN, creatinine, bilirubin and hypoglycaemia (Table). Blood samples were taken for haemato-biochemical and parasitological examination.

Accordingly, the affected animal was treated immediately with a single injection of Diminazene aceturate @ 5 mg/kg body weight intramuscularly along with supportive therapy like Inj Chlorpheniramine malleate @ 10 ml intramuscularly for 3 days and antipyretics (Inj Melonex @ 15 ml intramuscularly for 3 days) including intravenous infusions (Inj RL @ 500 ml and Inj NS@500 ml intravenously daily for 3 days). Affected animal was successfully recovered from the disease after complete therapeutic management.

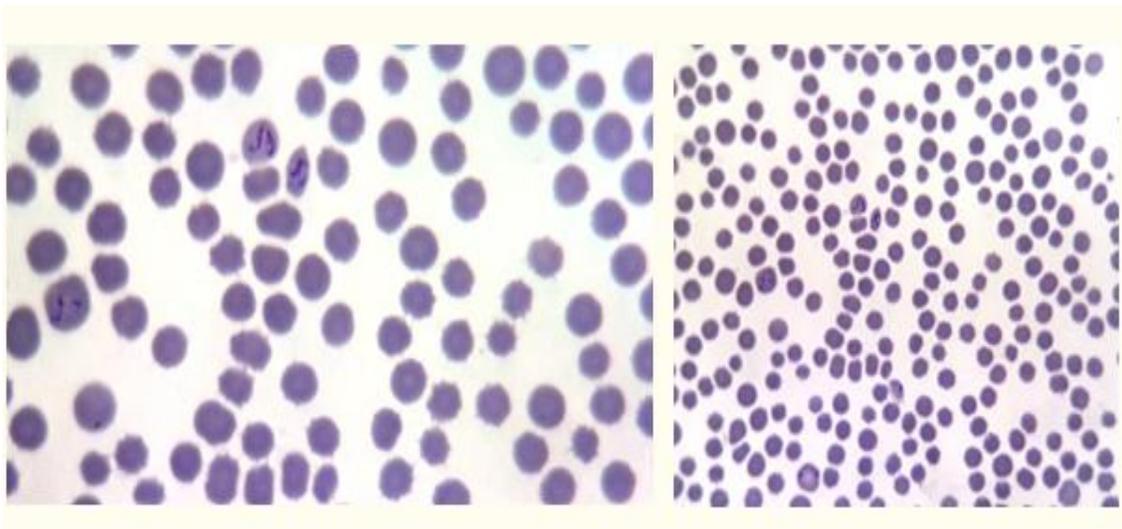
The predominant symptoms of babesiosis like elevated body temperature, pale conjunctival mucous membrane and haemoglobinuria suggestive of severe anaemia, increased respiratory rate and loss of body weight were observed in affected cow which are in agreement of published reports (Jyothisree *et al.*, 2013).

The severe anemia and hemoglobinuria in affected cow leads to the marked hemolytic process associated with the presence of *Babesia piroplasms* inside the erythrocytes and destruction of huge numbers of erythrocytes by the parasite resulting in hypohemoglobinemia and consequently hemoglobinuria (Georgi *et al.*, 1990; Bal *et al.*, 2016). The apparent increase in the levels of AST, ALT, alkaline phosphatase, SUN and creatinine signifies harmful effect of toxic metabolites of *Babesia bigemina* on liver cells lead to impairment and alterations of the liver and kidney enzymes. Previous workers also reported the significant increase in aspartate aminotransferase, alanine aminotransferase (ALT) and gamma glutamyltransferase (GGT) in babesiosis (Hussein *et al.*, 2007; Sharma *et al.*, 2016). A significant increase in total bilirubin in affected cow was due to hemolytic crisis of babesiosis and hepatic damage (Sharma *et al.*, 2016).

Table.1 Haematological and biochemical alterations of positive cow for Babesiosis

Parameters		Values	Reference range
Hb(g/dl)		5.8	8-15
TEC($\times 10^6/\mu\text{L}$)		3.8	5-10
TLC($\times 10^3/\mu\text{L}$)		15	4-12
DLC	Neutrophil(%)	42	15-45
	Monocyte(%)	7	2-7
	Lymphocyte(%)	48	45-75
	Basophil(%)	0	0-2
	Eosinophil(%)	3	2-5
Platelets($10^3/\mu\text{L}$)		170	200-730
PCV(%)		21	24-46
Blood Glucose (mg/dl)		25	45-75
SGPT/ALT(U/L)		70	11-40
SGOT/AST (U/L)		128	78-132
ALP (U/L)		410	68-320
Total bilirubin (mg/dl)		0.8	0.01-0.5
Serum urea nitrogen(mg/dl)		45	20-30
Creatinine(mg/dl)		2.8	1-2
Total protein(gm/dl)		7.20	6.74-7.46
Albumin(gm/dl)		3.4	3-3.6
Globulin(gm/dl)		3.8	3-3.5

Fig.1 Intra-erythrocytic *Babesia bigemina* organisms in Jersey cow



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