

# Therapeutical Management of Babesiosis in Cross-Bred Cow at Hyderabad, Sindh

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## ABSTRACT

Babesiosis is a tick-transmitted disease caused by protozoans of the genus *Babesia* and it is characterized by haemolytic anemia and fever, with occasional hemoglobinuria and death. In the present study, a cross-bred cow aged between 4-6 years was presented to the OPD of the departmental hospital with a history of fever, anorexia, passing coffee-colored urine, reduced milk yield, depression, and reluctance to move. Examination of the blood smears confirmed the *Babesia* spp. in all the cows. Microscopy detection methods are still the cheapest and fastest methods used to identify *Babesia* parasites although their sensitivity and specificity are limited. Haematological studies revealed reduced Hb, PCV, and TEC. Serum chemistry revealed hyperglycemia, hyperbilirubinemia, BUN, AST, and hypoproteinemia. Urine was positive for haemoglobin, glucose, and bile pigments. Three cows were treated successfully with diminazene aceturate (Berenil) at 3 mg/kg body weight, together with supportive therapy. Whereas, one cow died due to severe anemia.

**Keywords:** Haemoglobinuria, Cattle, Anemia, Jaundice, BUN

## Introduction

Bovine babesiosis is a tick-borne parasitic disease that results in significant morbidity and mortality in cattle [1]. The economic losses can be considerable, especially when animals with no immunity are moved into an endemic area. Three species of *Babesia* cause most clinical cases in cattle: *Babesia bovis* and *B. bigemina* are widespread in tropical [2]. It is a disease with a worldwide distribution affecting many species of mammals with a major impact on cattle and man [3]. The disease is particularly severe in naive animals introduced into endemic areas and is a considerable constraint on livestock development in many parts of the world [4]. It occurs most commonly in exotic crossbred cattle under stress conditions particularly in tropical and subtropical countries including Pakistan when the tick population is very high [3-5]. Most cattle *Babesia* do not seem to affect humans; however, *B. divergens* can cause rapidly progressing, life-threatening hemolytic anemia in people who have had splenectomies. The order Aconoidasida, family Piroplasmida, and genus babesidae have been assigned to *Babesia* [National Centre for Biotechnology Information: taxonomy browser]. This

disease is not only important for veterinarians, but it also has zoonotic potential. Humans are usually infected by *B. microti* and *B. divergens* species [6]. Ticks of the *Rhipicephalus* genus are the main vectors for disease transmission, but *Dermacentor reticularis*, *Haemaphysalis bispinosa*, and *Haemaphysalis longicornis* transmit *Babesia gibsoni*. Due to intravascular and extravascular hemolysis, the major clinical symptoms of Babesiosis in cattle include anemia and fever [7].

## Case Presentation and History

### Animal History

In the present study, a crossbred cow aged between 4-6 years was presented to the OPD of the departmental hospital with a history of fever, anorexia, passing coffee-colored urine, pale mucous membranes, and increased respiratory and heart rates, as well as decreased appetite, reduced milk yield, depression and reluctance to move.

### Clinical Examination

On clinical examination elevated temperature ranging from 103°F to 104.2°F, accelerated heart rate and respiration, dyspnoea, suspended rumination, presence of icteric mucus

membranes with mild to moderate tick infestation, and enlarged lymphnodes with haemoglobinuria were observed. Jaundice is sometimes apparent, especially when the clinical signs are less acute, and hemoglobinuria and hemoglobinemia are common in animals infected with *B. bigemina*. *B. bovis* can cause additional clinical signs via changes in red blood cells (RBCs) that result in their accumulation in capillaries, including those of the brain.

### Laboratory Analysis

Blood and serum were collected for laboratory investigation. Blood smears revealed presence of *Babesia* spp. in 40% of RBCs of all the smears. Haemogram revealed on average extremely low levels of Hb, PCV, TEC and platelets counts. Serum chemistry revealed hyperglycemia, hyperbilirubinemia, BUN, AST, and hypoproteinemia. The values are presented in Table 1. Urine was coffee colored and positive for haemoglobin, glucose, and bile pigments in the cow.

**Table 1: Average Hemato-biochemical values and urinalysis of affected cow**

Parameters	Apparently healthy cow values	Avg Pre-treatment values	Avg post-treatment values
Hemoglobin (g/dL)	8 - 15	4.5	6.3
PCV (%)	24 - 46	15	22
TEC X 10 <sup>6</sup> /μL	5 - 10	1.3	3.2
TLC X 10 <sup>3</sup> /μL	4 - 12	14.25	10.3
MCV (fL)	40 - 60	37.23	42.7
MCH (pg)	11 - 17	11.54	15.2
MCHC (g/dL)	30 - 36	23.21	31.1
Platelets / μL	100000 - 800000	57000	92000
Neutrophils (%)	20 - 45	40	46
Lymphocytes (%)	45 - 75	51	48
Monocytes (%)	2 - 7	2	3
Eosinophils (%)	2 - 8	7	3
Basophils (%)	0 - 1	-	-
<b>Serum Biochemical Values</b>			
AST (U/L)	78 - 132	167	124
TP (g/dl)	5.7 - 8.1	5.8	6.1
BUN (mg/dl)	6 - 27	32	24
Tot. Bilirubin (mg/dl)	0.01 - 0.5	0.9	0.56
Glucose (mg/dl)	45 - 75	110	65
Creatinine (mg/dl)	1 - 2	0.9	0.83
<b>Urinalysis</b>			
Blood (Hb)	-	+++	-
Glucose	-	±	-
Bile pigments	-	++	±

### Treatment

The animal was treated with a single dose of Diminazine accurate (Inj. Berenil RTU, Hoechst®) 3 mg/kg Bwt i/m at two different sites in neck muscles, long-acting oxytetracycline (Inj. Intamycin-LA, Intas Pharmaceuticals) @ 20 mg / kg body wt i/m at 48 hours intervals on two occasions, haematinic (Inj.

Feritas, Intas Pharmaceuticals®) 10 ml i/m thrice weekly for one week, rumenotonic (liquid Brotone, Virbac® Animal Health) 40 ml daily orally for 10 days and Injection Rintose (Wockhardt®) 500 ml i/v daily for 3 days. After 3 days temperature reduced drastically to 102°F. Hb and PCV levels improved after 3 wks. Treatment was successful with diminazene aceturate (Berenil) at 3 mg/kg body weight, together with supportive therapy.

### Discussion

Babesiosis is a tick-transmitted disease caused by protozoans of the genus *Babesia* and it is characterized by haemolytic anemia and fever, with occasional hemoglobinuria and death [8]. The minimum infective dose required to produce overt disease is thought to be 103 parasites inoculated intravenously [9]. Variations in the number of parasites injected result in highly significant changes to the prepatent period, peak parasitemia, and the hematological response. In addition to the number of infected ticks that feed on an animal, the immune status of the host and the virulence of the infecting strain. Subclinical infections are quite common and are usually missed by the farmer and clinician. Affected animals have low parasitemia, may suffer mild fever and anorexia, and make an uneventful recovery [10]. Hemoglobinuria, frequently the clinical sign first detected by the owner, occurs at the peak of the hemolytic crisis is in accordance with the present cases. Immediately after the hemolytic crisis, a brief lymphocytosis and monocytosis combine to cause a leukocytosis [11].

Detection and treatment of babesiosis are important tools to control babesiosis. Microscopy detection methods are still the cheapest and fastest methods used to identify *Babesia* parasites although their sensitivity and specificity are limited [12]. When tick population is very high, the disease may be so acute as to cause death within a few days, during which the PCV falls below 20% and the parasitaemia, which is usually detectable once the clinical signs appear and may involve 0.2% to 45% of the red cells, depending on the species of *Babesia* [11]. Most of the clinico-haematological findings observed in our cases were similar to those reported earlier [10]. For years, babesiosis treatment has been based on the use of very few drugs like imidocarb or diminazene aceturate. Recently, several pharmacological compounds were developed and evaluated, offering new options to control the disease [13]. Diminazene aceturate consists of an organic base and organic acid but once dissolved in water, it dissociates. It is usually given by intramuscular injection at doses of 3-5 mg/ kg [13]. Long acting oxytetracycline has been shown to have a prophylactic effective against *Babesia divergens* infection [7]. In human's treatment with quinine and clindamycin, successfully eradicated the organisms. Subsequent studies in animals have supported the usefulness of this combination of antimicrobial agents [3]. Prolonged convalescent period results in considerable loss of production for a long period in babesiosis [5]. B-complex and oral haematinics were continued for 3 weeks till the animals were completely recovered from anemia.

**Conflict of Interests:** There exists no conflict of interest.

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