

A STUDY ON BABESIOSIS IN CALVES AT LIVESTOCK EXPERIMENTAL STATION QADIRABAD AND ADJACENT AREAS, SAHIWAL (PAKISTAN)

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The present study aimed to determine the prevalence and chemotherapy of babesiosis in crossbred cow calves at the Livestock Experimental Station Qadirabad, District Sahiwal, Pakistan. The effect of babesiosis on different blood parameters was also studied. Among 415 crossbred cow calves examined, 30 calves were found positive, showing 7.2% prevalence. For chemotherapeutic trials, 30 infected calves and 10 healthy ones were divided into 4 groups viz. A, B, C and D with 10 animals in each group. The animals of group A and B were treated with diminazene aceturate (Fa-try-banil, Prix, Pharma, Pakistan) and imidocarb dipropionate (Imizol, ICI, Pakistan) @ 3.5 mg/kg BW IM and 1ml/100 kg BW IM, respectively. Animals of group C and D served as positive control and negative control, respectively. The efficacy of diminazene aceturate and imidocarb dipropionate was 90% and 100%, respectively. Haematological studies revealed a significant decrease in haemoglobin concentration and total erythrocyte count in *Babesia* positive animals as compared to negative control. From the results it was concluded that imidocarb dipropionate is a drug of choice to treat babesiosis in crossbred cow calves followed by diminazene aceturate.

Keywords: Diminazene, imizol, babesia, haemoglobin

INTRODUCTION

Babesiosis is an emerging tick-borne disease of cattle and domestic buffalo (*Bubalus bubalis*), caused by hemoparasite of genus *Babesia* and is prevalent all over the world. This disease has considerable economic, medical and veterinary impact (Roy, 1990). The hemoparasitic diseases threaten an estimated 250 million cattle and act as a major constraint on livestock production and improvement in many developing countries (Radostits *et al.*, 2000).

Babesiosis is characterized by high fever and intravascular haemolysis, leading to anaemia, icterus, haemoglobinuria and death. Mortality is extremely variable and may be to 50% or higher, but in the absence of undue stress, with early and effective treatment, the mortality rate can be reduced to 5% (Mahoney, 1977). The greatest infection rate is seen in animals at 6-12 months of age. The average age at which calves in enzootic areas become infected is 11 weeks, but at this early age clinical signs and pathological changes are mild and short lived (Radostits *et al.*, 2000).

Prevalence of babesiosis in Pakistan has been reported by different workers as 5.5- 42.8% in cattle and buffaloes, variations depend upon factors like age, breed, season, activity of ticks etc., and is economically important disease in Pakistan. Outbreak in exotic and crossbred cattle has mostly been reported during the hot and humid months. Occurrence of babesiosis has been reported in apparently healthy animals and both in cattle and buffaloes. This paper

describes the prevalence of babesiosis, its chemotherapy and effect on various blood parameters in crossbred cow calves.

MATERIALS AND METHODS

Prevalence

A total of 415 crossbred cow calves were examined between May 2005 to July 2005 to find out the prevalence of babesiosis at the Livestock Experimental Station (LES), Qadirabad and its surrounding areas. Thin blood smears on clean glass slides were prepared from each animal after having punctured marginal ear vein. These blood smears were air dried, fixed in methyle alcohol for 10 minutes and stained with working dilution of Giemsa stain (1:10) for 30 minutes. The smears were then washed with tap water to remove extra stain and air dried (Benjamin, 1986). The stained blood smears were examined under oil immersion lens of microscope (100X) for the presence of babesia. *Babesia* were identified by their morphological characteristics as described in standard texts.

Chemotherapy

Thirty calves positive for babesiosis were divided into three equal groups viz. A, B and C. Another 10 healthy calves were included in the study as group D. The calves of group A were treated with diminazene aceturate (Fa-try.banil; Prix Pharma, Pakistan) @ 0.5 ml/10kg BW IM, whereas the calves of group B were given with imidocarb dipropionate (Imizol, ICI,

Pakistan) @ 1ml/100kg BW IM. The animals of group C were kept as positive control and that of group D as negative control. Blood samples from these calves were collected from the ear vein at day 0 (pre-medication) and day 3, 7, 10 post-medication. These blood samples were examined under the microscope after making a thin smear and staining with Giemsa stain. Efficacy of drugs was determined on the basis of disappearance of *Babesia* in the blood smears and reversal of clinical signs.

Haematological studies

About 10 ml of blood was collected from the jugular vein of the infected calves, into a sterilized and dry syringe with needle after disinfecting the site of puncture. Haematological examination of blood samples from all the calves of four groups was carried out at day 0 (pre-medication) and then at day 3, 7 and 10 post-medication. The effect of babesiosis on haemoglobin and total erythrocyte count was determined by the procedure as described by Benjamin, (1986). Statistical analysis was performed by using analysis of variance and post HOC test with the help of SPSS computer software (Duncan, 1995).

RESULTS AND DISCUSSION

Prevalence

In the present study, the overall prevalence of babesiosis in calves was 7.2%. Month-wise prevalence showed that in May 2(1.6%), in June 7(5.03%) and in July 21(13.8%) calves were infected with *Babesia* (Table 1). Jeon (1970) also recorded 7.5% prevalence of babesiosis in cattle. The findings of present study also correlated with the findings of Guglielmone *et al.* (1997) who reported the prevalence of *Babesia bovis* ranging from 7.6% to 18.2% in Argentina. Nazir (2002) reported 7% prevalence of babesiosis in cattle at

MalaKand Agency NWFP, Pakistan. Aulakh (2003) reported the prevalence of babesiosis as 5.94% in India, which is also in close agreement with the results of present study. The minute difference may be due to different climatic conditions. The results of the present study are not in agreement with Chandrawathani *et al.* (1994), Bell *et al.* (2004) and Oliveira *et al.* (2005) who reported prevalence range of 70 to 100 %. This difference may be attributed to the application of highly sensitive tests like PCR, ELISA, and CFT for diagnostic purposes.

Therapeutical studies

The calves of the group A treated with Fa-try-banil (diminazene aceturate) at the dose rate of 3 mg/kg body weight showed 90 % efficacy at 10th day post medication (Table 2). The results of present study are in accordance with those of Kuttler (1980) who found that in practice diminazene aceturate 3-5 mg/kg body weight is most oftenly used. The findings of present study are in agreement with the findings of Aulakh (2003) who used quinapyramine sulphate @ 3-5 mg/kg BW subcut, Buparvaquone @ 1 ml/20kg BW IM, and diminazene aceturate @ 1.6 gm/100kg BW IM for the effective treatment of trypanosomiasis, theileriosis and babesiosis, respectively in India. The animals in group B were treated with Imizol (imidocarb dipropionate) @ 2mg/kg showed 70% efficacy at day 3, 90% at day 7 and 100% at day 10. These results are in agreement with Kuttler (1980), Karimov and Gafurov (1984) who treated the bovine babesiosis with Imidocarb dipropionate successfully at the dose rate of 2mg/kg BW.

Haemoglobin estimation

The results of present study showed that the mean values of haemoglobin concentration in group A at day zero, 3rd, 7th and 10th day were 6.46 ± 0.86, 7.42±1.46,

Table 1. Prevalence of babesiosis in cow calves at LES, Qadirabad and its adjacent areas

Month	No. of calves examined	No. of calves infected	Percentage of infection
May 2005	125	2	1.6
June 2005	139	7	5.03
July 2005	151	21	13.9
Overall	415	30	7.2

Table 2. Efficacy of imidocarb dipropionate and diminazene aceturate against babesiosis in cow calves

Group n=10	Drug	Efficacy (%) of drug at day		
		3	7	10
A	Diminazene aceturate	40	50	90
B	Imidocarb dipropionate	70	90	100
C	Control positive	-	-	-
D	Control negative	-	-	-

8.57±1.54 and 9.07± 1.54 g/dl, respectively. In group, B the mean values of haemoglobin concentration in calves at day zero, 3rd, 7th and 10th day were 5.95 ± 1.07, 6.56± 1.16, 7.12± 0.93 and 8.38± 0.95 g/dl of blood, respectively. In group, C the mean values of haemoglobin concentration on day zero, 3rd, 7th and 10th day were 7.26± 0.45, 7.06± 0.49, 6.96± 0.46 and 6.76± 0.52 g/dl respectively while in group D the mean values of haemoglobin concentration at day zero, 3rd, 7th and 10th day were 10.6± 1.09, 10.6 ± 1.01, 10.63± 1.02 and 10.64 ± 1.05 g/dl respectively, which are close to the normal values in calves. It was observed that a significant difference $P < 0.05$ was present among the groups. The results of this study are very close to those of Sharma and Bansal (1984), Aulakh (2003) and Bala (2003). They observed a marked decrease in haemoglobin concentration in animals suffering from babesiosis. The results of the present study are also in line with Nazir (2002) who described that there is a decline in haemoglobin concentration from 9.4± 0.29 g/dl to 5.0 ± 0.5 g/dl in crossbred cattle positive for babesiosis in Malakand Agency N.W.F.P., Pakistan.

Total Erythrocyte Count

In group A the mean values of TEC in calves at day zero, 3rd, 7th and 10th day were 3.26±1.08, 3.84±1.26, 4.35±1.30, and 5.67±1.34 ($\times 10^6/\mu\text{L}$), respectively. In group B, the mean values of TEC in calves at day zero, 3rd, 7th and 10th day were 3.71±1.52, 4.72±1.67, 5.33±1.49, and 6.16±1.28 ($\times 10^6/\mu\text{L}$), respectively. In group C, the mean values of TEC in calves at day zero, 3rd, 7th and 10th day were 3.94±1.42, 4.03±1.21, 4.02±1.12, and 3.97±1.07 ($\times 10^6/\mu\text{L}$), respectively while in group D, the mean values of TEC in calves at day zero, 3rd, 7th and 10th day were 5.72±2.05, 5.87±1.85, 5.94±1.82, and 5.95±1.77 ($\times 10^6/\mu\text{L}$), respectively. It was observed that a significant difference $P < 0.05$ was present among the groups. The findings of the present study are in agreement with those of Nazir (2002) who noted a significant decline in TEC from 8.2±0.34 to 5.0±0.16 ($\times 10^6/\mu\text{L}$) in crossbred cattle of Malakand Agency N.W.F.P. Pakistan. The results of present study are very close to the findings of Aulakh (2003) and Bala (2003), who observed a decrease in TEC of *Babesia* infected animal.

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