Efficacy of various antiprotozoal drugs on bovine babesiosis, anaplasmosis and thileriosis

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Abstract

The present study was conducted to check out the efficacy of various antiprotozoal drugs on bovine babesiosis, anaplasmosis and theleriosis. 38 buffaloes naturaly infected with anaplasma, babesia and theileria were selected and divided into four groups. Group A (10), B (10), C (08) and D (10) infected with anaplasmosis, babesiosis, theileriosis, and Infected Control (anaplasmosis (4), anaplasmosis + babesiosis (1 each), babesiosis (2) and theileriosis (2) respectively. Group A was further subdivided into A-I (5 animals with pure Anaplasmosis) and A-II (5 animals with mixed infection of Anaplasmosis and Babesiosis). Group-A was treated with a single dose of imidocarb dipropionate (3 mg / kg body weight). In Group A-I one animal recovered completely, 02 moderately while remaining 02 animals did not respond. The later 02 animals recovered completely after additional 02 doses of 4 mg/kg body weight. In case of group A-II complete recovery was recorded in one animal, moderate recovery in three animals while one animal showed no responsel. Group B was treated with Diminazene acceturate (3. 5 mg / kg body weight) administered as a single dose. 6 animals recovered completely, 02 moderately while 02 animals showed no response. Group C was treated with a single dose of Buparvaqune (2.5 mg / kg body weight), complete recovery was recorded in 4 animals, 2 animals showed no response, while 2 animals with severe infection died after 24 hrs. .

Keywords: Babesiosis, anaplasmosis, theileriosis, drug efficacy, buffalo

Introduction

Animal diseases are perhaps the most important limitation to animal production in developing countries. According to FAO estimates, there are 50 percent production losses due to diseases (PSAC, 1967). Major epizootic diseases of livestock that threaten production have either been eradicated or are under control in the developed world. Among these, the parasitic diseases have gained special significance due to adverse effects on production (Drummond et al, 1978).

The prototype protozoa of animal world are trypanosomes, babesia, theileria, anaplasma and plasmodium. These are transmitted by means of a vector to final host and cause great economical losses (Purnell, 1985). Blood protozoa are introduced into new areas and countries due to free movement of livestock from one place to another. All domestic animals are prone to infection but buffalo, cattle and pig serve as reservoir hosts (Soulsby, 1982).

East coast fever, anaplasmosis and piroplasmosis occupy major place because of their fatality and adverse effects on animal productivity. The incidence and prevalence of these diseases and their morbidity and mortality is very high in developing countries (PSAC, 1967).

Control of parasitic diseases is achieved by different means , such as biological control, genetic control, and by chemotherapy and vaccines. The most effective and confirmed method of control is through the strategic use of drugs which kill the parasites without harming the host. Many of the standard chemotherapies are used today, however expensive, with toxic side effects and in some cases have marginal efficacy because of the emergence of drug resistant parasites (Cheesman, 2000).

The treatment of Babesiosis is dependent upon availability of a particular drug in the market. Quinuronium sulphate, Pentamidium, Amicarbalide, Diminazene aceturate and imidocarb are most commonly used drugs (Urquhart et al, 1988). Remedy for Theileriosis is best observed by Buparvaquone, which is more effective and reliable drug than any other in field condition (Nasir, 2000). Previously both Menoctone and Halofuginone were shown to have high level of activity against Theileria parva and T.annulata in laboratory trials (Soulsby, 1982).

Tetracyclines (Chlortetracycline, Tetracycline

Table-1. Efficacy of Iimidocarb dipropionate against anaplasomosis and babesiosis in buffaloes

Group	Infection	Drug used	Intensity (Before treatment)	Intensity (After treatment)
A	Anaplasmosis (5 animals)	Iimidocarb dipropionate (3 & 4mg/kg)	+	+ ***
			+	++ ***
			++	+
			+++	++
			+++	-
	Mixed infection of anplasmosis and babesiosis (5 animals)	Iimidocarb dipropionate (3 & 4mg/kg)	+	+
			++	-
			++	+
			+++	++
			+++	++

Table-2. Efficacy of Diminazene against Babesiosis in buffaloes

Group	Infection	Drug used	Intensity (Before treatment)	Intensity (After treatment)
B	Babesiosis (10 animals)	Diminazene (3.5mg/kg)	+	-
			+	-
			+	-
			+	-
			+	-
			+	-
			+	+
			+	+
			++	+
			++	+

and Oxytetracycline) are used for the treatment of anaplasmosis. Other compounds such as Imidocarb eliminate parasites from carrier animals (Urquhart et al, 1988).

Materials and Methods

Experimantal design: 38 infected buffaloes of different ages were selected and divided into four groups A (10), B (10), C (08) and D (10) infected with anaplasmosis, babesiosis, theileriosis, and Infected Control (anaplasmosis = 4, anaplasmosis + babesiosis = 2, babesiosis = 2, theileriosis = 2) respectively. Group A was further subdivided into A-I (5 animals with pure anaplasmosis) and A-II (5 animals with mixed infection of anaplasmosis and babesiosis).

Catagorization of infection: Thick blood films were categorized by plus system suggested in Basic Laboratory Methods in Medical Parasitology, by WHO (1991).

+ (Light)1-10 parasites per 100 thick blood film fields.
++ (Moderate) 11- 100 parasites per 100 thick blood film fields
+++ (Heavy) 1-10 parasites per thick blood film field
++++ (Severe) more than 10 parasites per thick blood film field.

Drugs used: Iimidocarb dipropionate 120mg / ml was used in group A-I and A-II. A single therapeutic dose at the rate of 3 mg/ kg intramuscular was used and the second dose of 4 mg / kg body weight was used in group A-I (pure anaplasmosis) to eliminate carrier state. Diminazene (Diminazene acceturate) 35mg / ml was used against babesiosis (Group-B). Single therapeutic dose at the rate of 3.5 mg/ Kg was administered by deep intramuscular and Buparvaqune 50mg/ml was used for theileriosis (Group C). Single therapeutic dose at the rate of 2.5 mg/ Kg intramuscular was used.

Results and Discussion

The study was carried out to test the efficacy of various drugs under field conditions against blood protozoa.The infected animals were treated with Iimidocarb dipropionate, Diminazene and Buparvaqune. Iimidocarb dipropionate was used in Group- A-I and Group –A-II. Out of 5 buffaloes (group, A-I) one animal with heavy infection recovered completely, while two with moderate and heavy intensities recovered moderately. The remaining two animals with light intensity showed no response to the single dose, although both recovered completely with two additional doses administered at a rate of 4 mg/ kg body weight. Out of 5 animals in group A-II, complete recovery was observed in one animal with moderate infection. Two with heavy infection recovered moderately while, one with light infection showed no response. However, one with moderate infection also moderately recovered after 15 days of treatment (Table-1). Present study showed 80 percent efficacy of

Table-3. Efficacy of Buparvaquone against Theileriosis in buffaloes

Group	Infection	Drugused	Intensity (Before treatment)	Intesity (After treatment)
C	Theileriosis (08 animals)	Buparvaquone (2.5mg/kg)	+	-
			+	-
			+	-
			+	+
			+	+
			++	-
			++++	Died after 24 hr.
			++++	Died after24 hr.

Table- 4. General picture of infected control group

Infection	Severity	Change after 15 days
Anaplasmosis	++	++
	+	++
	++++	++++
	++	++
Babesiosis	++	++
	+	+
Mixed infection of anplasmosis and babesiosis (5 animals)	+++	++++
	++	++
Theileriosis	+	++
	+	+

imidocarb dipropionate.

The lack of response of the lightly infected animals to the single dose of Iimidocarb dipropionate may be due to light infection, which is close to carrier stage and is not clinical . When two dose therapy at 4 mg/ kg body weight was carried out, the carrier state was eliminated. This study is in line with Chakrabarti, (1996), McDougald and Edward, (1988) and Robertson, (1976), who also used Imidocarb at the rate of 5 mg / kg body weight.

In Group B six buffaloes with light infection completely recovered. After diminizine treatment, two animals with moderate infection showed moderate recovery, while remaining two with light infection showed no response to diminizine (Table-2). McDougald and Edward (1988) and Robertson (1976) suggested that Diminizine rapidly clears Babesia bigemina from blood at a dose of 3.5mg/kg body weight.

The results of present study revealed in group C that 4 animals out of 8 showed complete recovery and two animals with light intensity of infection showed no response to buparvaqune. Where as 2 animals with severe infection died after 24 hours despite treatment (Table-3). The findings are in accordance with Nasir (2000), who reported 55 percent efficacy. In contrast Muhammad et al, (1999) reported 93 percent efficacy of Buparvaquone and Oxytetracycline in Faisalabad, the difference may be due to the use of Oxytetracycline with Buparvaquine, While in India, Anonymous, (1993) reported 98.8 percent cure rate and Patil et al, (1995) recorded 80 percent cure rate.

In infected control group (Group-D) 3 animals infected with anaplasmosis were showed no signs of change but in one animal intensity was changed from light to moderate. One animal with mixed infection (anaplasmosis and babesiosis) was showed no sign of change while the other one showed increase in infection from heavy to severe. Both the animals kept for babesiosis showed no sign of change after fifteen days. In two animals infected with theileriosis, infection rate was changed from light to moderate in one animal while in other infection rate remained same (Table-4).

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