

Therapeutic efficacy of isometamidium hydrochloride and diminazene diaceturate in treatment of trypanosomiasis in horses

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Abstract

Twelve equines found positive for *Trypanosoma evansi* in Giemsa-stained thin blood smears (GSTBS) were divided in two groups (n=6) each. Group-I was treated with isometamidium hydrochloride (@ 0.5mg/kg b.wt I/M once) and Group-II was treated with diminazene diaceturate (@ 5mg/kg b.wt I/M). Giemsa-stained thin blood smears examination could detect *T. evansi* in 2 horses treated with diminazene diaceturate on 3rd day of treatment while all six horses treated with isometamidium hydrochloride were found negative. Horses positive for *T. evansi* on 3rd day were found negative after another dose of diminazene diaceturate. Increase in the value of Hb and TEC was observed on 7th day post treatment in isometamidium hydrochloride than diminazene diaceturate treated group. Aspartate amino transferase, ALP and GGT also showed significant decrease in isometamidium hydrochloride treated equines as compared to diminazene diaceturate on 3rd and 7th day post treatment. It was found that isometamidium hydrochloride was effective in treatment of horses with trypanosomiasis when compared to diminazene diaceturate

Keywords: Equine, Trypanosomiasis, GSTB, Isometamidium hydrochloride, Diminazene diaceturate

Introduction

Trypanosomiasis is a worldwide prevalent and is of great economic importance (Rathore *et al.*, 2016). Most of the direct losses in the animals are due to mortality and cost of treatment. The indirect losses are due to morbidity, reduced milk yield, draught power, reduce birth rates leading to abortion and poor weight gain (Kumar *et al.*, 2021). According to Buscher *et al* (2019) drugs used for treatment of equine trypanosomiasis consisted of diminazene diaceturate, combination of quinapyramine choride/quinapyramine sulphate, melarsomine hydrochloride (suramin), isometamidium hydrochloride having both curative and prophylactic effect. This paper describes a treatment trial with diminazene diaceturate and isometamidium hydrochloride in horses with trypanosomiasis.

Materials and Methods

Horses presented to Veterinary Clinics complex, R.S.Pura were screened by Giemsa stained thin blood smear (GSTBS) examination for presence of trypanosomes in blood smears. Twelve horses with

Trypanosomiasis were divided in two groups with six in each. Group-I was treated with isometamidium hydrochloride (@ 0.5mg/kg b.wt I/M) and Group-II with diminazene diaceturate (@ 5mg/kg b.wt I/M). Haemoglobin (Hb), packed cell volume (PCV), total erythrocyte count (TEC) and total leukocyte count (TLC) and differential leukocyte count were determined as per standard method. Blood glucose, total plasma protein (TPP), albumin (ALB), plasma urea nitrogen (PUN), creatinine (CRT), total bilirubin (TBIL), direct bilirubin (DBIL), ALT, AST, ALP, Plasma fibrinogen and GGT were estimated as per standard methods. Therapeutic efficacy was evaluated on basis of alleviation in clinical signs, GSTBS examination for presence or absence of *Trypanosoma* and estimation of hematobiochemical parameters on 0th, 3rd and 7th days of treatment.

Results and Discussion

The present study could detect *T. evansi* in the blood smears of two horses in diminazene diaceturate treated group on 3rd day post treatment while all six horses of isometamidium hydrochloride treated group were found negative for *T. evansi*. Horses positive for *T. evansi* on 3rd day were given another dose of diminazene

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diaceturate and post treatment examination of animal's blood smears were found negative for *T. evansi* in both groups. Mean values of haematological and biochemical parameters of *Trypanosoma* affected horses treated with isometamidium hydrochloride and diminazene diaceturate are presented in Tables 1 and 2. Significant increase in the value of Hb and total erythrocyte count was observed on 7th day post treatment in isometamidium hydrochloride treated horses as compared to diminazene diaceturate. ALB, GLB, A:G, TBIL, DBIL, IBIL and fibrinogen showed non- significant difference between

the two treated groups. AST, ALP and GGT showed significant decrease in isometamidium hydrochloride treated equines as compared to diminazene diaceturate on 3rd and 7th day post treatment. Singh *et al.* (2012) also found significant increase in TEC in *T. evansi* affected horses treated with antrycide prosalt and isometamidium hydrochloride. On the basis of post-treatment clinical evaluation and PCR it was concluded that isometamidium has superior effect (Raftery *et al.*, 2019). In the present study, it was found that isometamidium hydrochloride was effective when compared to diminazene aceturate in the treatment of trypanosomiasis in horses

Table 1: Haematology of *Trypanosoma* affected horses treated with isometamidium hydrochloride and diminazene diaceturate (Mean $\pm$ S.E).

Day	Drug	Hb (gdl ⁻¹)	PCV (%)	TEC (10 ⁶ μ l ⁻¹)	PLT (lac μ l ⁻¹)	MCV (fl)	MCH (pg)	MCHC (%)
0 th day	Isometamidium hydrochloride (n=6)	7.48 $\pm$ 0.63	23.55 $\pm$ 2.31	3.19 $\pm$ 0.25	146.50 $\pm$ 18.27	73.04 $\pm$ 2.63*	23.38 $\pm$ 0.25	32.17 $\pm$ 0.91
	Diminazene diaceturate (n=6)	6.49 $\pm$ 0.34	20.83 $\pm$ 1.01	3.25 $\pm$ 0.11	135.67 $\pm$ 15.30	64.01 $\pm$ 1.76	19.95 $\pm$ 0.73	31.21 $\pm$ 1.10
3 rd day	Isometamidium hydrochloride (n=6)	7.98 $\pm$ 0.60	24.83 $\pm$ 2.04	4.29* $\pm$ 0.31	159.50 $\pm$ 11.96	57.64 $\pm$ 1.44	18.60 $\pm$ 0.62	32.27* $\pm$ 0.69
	Diminazene diaceturate (n=6)	6.66 $\pm$ 0.31	21.83 $\pm$ 1.01	3.53 $\pm$ 0.13	161.83 $\pm$ 12.30	61.99 $\pm$ 2.69	18.92 $\pm$ 0.88	30.53 $\pm$ 0.58
7 th day	Isometamidium hydrochloride (n=6)	8.50* $\pm$ 0.52	26.33 $\pm$ 1.69	4.75* $\pm$ 0.33	179.00 $\pm$ 11.32	55.65 $\pm$ 1.44	17.99 $\pm$ 0.30	32.39 $\pm$ 0.71
	Diminazene diaceturate (n=6)	7.08 $\pm$ 0.30	22.50 $\pm$ 1.15	4.07 $\pm$ 0.21	185.0 $\pm$ 0.21	55.34 $\pm$ 1.28	17.48 $\pm$ 0.57	31.60 $\pm$ 0.76

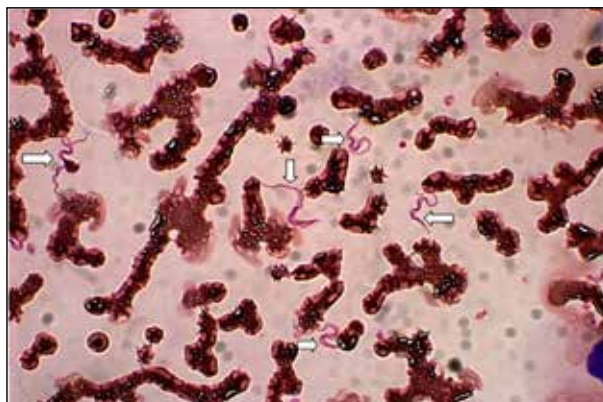


Fig.1 Giemsa stained thin blood smear of horse showing *Trypanosoma evansi*. (Arrows)

Table 2: Biochemical profiles of *Trypanosoma* affected horses treated with isometamidium hydrochloride and diminazene diacetate (Mean $\pm$ S.E)

Day	Drug	TPP (gdl ⁻¹)	ALB (gdl ⁻¹)	GLB (gdl ⁻¹)	A:G	BUN (mgdl ⁻¹)	CRT (mgdl ⁻¹)	TBIL (mg/dl)	DBIL (mg/dl)	IBIL (mg/dl)	ALT (IU/L)	AST (IU/L)	ALP (IU/L)	GGT (IU/L)	FIB (mg/dl)	GLU (mg/dl)
0 th day	Isometamidium hydrochloride (n=6)	8.92 $\pm$ 0.29	3.17 $\pm$ 0.13	5.75 $\pm$ 0.37	0.57 $\pm$ 0.05	23.87* $\pm$ 1.94	1.37 $\pm$ 0.11	3.55 $\pm$ 0.34	1.60 $\pm$ 0.22	1.95 $\pm$ 0.16	28.93 $\pm$ 3.30	191.42 $\pm$ 7.90	144.37* $\pm$ 11.95	17.72 $\pm$ 0.90	635.67 $\pm$ 30.64	69.03 $\pm$ 2.97
	Diminazene diacetate (n=6)	8.27 $\pm$ 0.18	3.17 $\pm$ 0.13	5.10 $\pm$ 0.22	0.63 $\pm$ 0.05	26.73 $\pm$ 2.32	1.58 $\pm$ 0.09	4.71 $\pm$ 0.27	1.60 $\pm$ 0.22	3.11 $\pm$ 0.36	31.9 $\pm$ 4.02	203.78 $\pm$ 15.50	185.22 $\pm$ 17.65	20.13 $\pm$ 0.82	563.17 $\pm$ 44.37	61.88 $\pm$ 2.52
3 rd day	Isometamidium hydrochloride (n=6)	8.15 $\pm$ 0.21	3.21 $\pm$ 0.10	4.94 $\pm$ 0.20	0.66 $\pm$ 0.04	19.67 $\pm$ 1.50	1.10* $\pm$ 0.05	2.78 $\pm$ 0.13	1.06 $\pm$ 0.02	1.72 $\pm$ 0.11	30.97 $\pm$ 5.05	165.3* $\pm$ 12.77	135.30* $\pm$ 12.55	15.99* $\pm$ 0.91	492.83 $\pm$ 12.63	87.65** $\pm$ 3.25
	Diminazene diacetate (n=6)	8.09 $\pm$ 0.11	3.17 $\pm$ 0.13	4.9 $\pm$ 0.12	0.65 $\pm$ 0.04	22.45 $\pm$ 3.13	1.47 $\pm$ 0.06	3.39 $\pm$ 0.17	1.24 $\pm$ 0.09	2.16 $\pm$ 0.16	30.75 $\pm$ 3.24	200.53 $\pm$ 12.43	189.38 $\pm$ 19.03	19.73 $\pm$ 0.68	559.83 $\pm$ 43.64	67.08 $\pm$ 1.25
7 th day	Isometamidium hydrochloride (n=6)	7.56* $\pm$ 0.14	3.24 $\pm$ 0.11	4.32 $\pm$ 0.11	0.75 $\pm$ 0.04	17.67 $\pm$ 0.84	1.09 $\pm$ 0.07	1.79 $\pm$ 0.13	0.58* $\pm$ 0.05	1.21 $\pm$ 0.14	24.00 $\pm$ 2.70	145.1* $\pm$ 6.68	119.83* $\pm$ 7.87	11.02* $\pm$ 1.94	352.00 $\pm$ 14.68*	88.65 $\pm$ 2.43
	Diminazene diacetate (n=6)	8.15 $\pm$ 0.16	3.32 $\pm$ 0.13	4.83 $\pm$ 0.16	0.69 $\pm$ 0.04	21.12 $\pm$ 2.93	1.36 $\pm$ 0.08	1.82 $\pm$ 0.10	0.87 $\pm$ 0.06	0.94 $\pm$ 0.06	27.83 $\pm$ 2.04	196.03 $\pm$ 9.27	182.72 $\pm$ 16.07	18.32 $\pm$ 0.82	497.33 $\pm$ 45.44	69.58 $\pm$ 1.49

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