Communications

Changes in levels of transminases in goats experimentally infected with *Trypanosoma congolense*

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ADAH (M.I.), OTESILE (E.B.), JOSHUA (R.A.). Variations des taux de transaminases observées chez des chèvres infectées expérimentalement par *Trypanosoma congolense*. *Revue Élev. Méd. vét. Pays trop.*, 1992, **45** (3-4) : 284-286

Une infection expérimentale à *Trypanosoma congolense* a été réalisée chez des chèvres, traitées ensuite par Bérénil[R] après 9 jours d'infection. L'infection a produit une augmentation des taux de transaminases glutamiques-oxalo-acétiques (TGO) et des transaminases glutamiques-pyruviques (TGP). Les taux moyens de TGO constatés chez les chèvres naines d'Afrique de l'Ouest infectées ont été généralement inférieurs à ceux des chèvres Red Sokoto infectées. L'administration de Bérénil[R] n'a pas entraîné d'effet significatif sur les taux de transaminases probablement en raison de l'infection récidivante constatée dans cette étude. *Mots clés* : Chèvre - Trypanosomose - *Trypanosoma congolense* - Transaminase - Nigeria.

Introduction

Of all the livestock diseases endemic on the African continent, trypanosomosis has been regarded as the largest single factor which limits the number and productivity of cattle, sheep and goats (5, 11).

In spite of concerted efforts in research and published work, there stil appears to be a dearth of information in the area of transaminase activities in trypanosomosis caused by *T. congolense* particularly in goats. This paper attemps to investigate the effect of experimental *T. congolense* infection on transaminase levels in this species.

Materials and Methods

Ten male goats (5 West African dwarf and 5 Red Sokoto) of 10 months to one year of age were obtained from Bodija goat market and housed in the experimental animal house of the Faculty of Veterinary Medicine, University of Ibadan, Nigeria. They were dewormed using Febantel[R] (Bayer, Germany), sprayed with Asuntol[R] (Bayer, Germany) and later treated with Berenil[R] (Hoescht, Germany). The animals were also vaccinated against "peste des petits ruminants". Their feed comprised a variety of freshly cut grass and *centrosema* species and supplemented with maize bran mixed with soyabean cake, blood meal, bone meal and salt *ad libitum*. They were stabilized for four weeks prior to experimental infection.

Mice used for transporting and maintaining trypanosomes were obtained from parasitology unit of the Nigerian Institute for Trypanosomiasis Research (NITR), Vom, Nigeria. They were fed rat pellets (Pfizer, Nigeria) *ad libitum*.

Trypanosoma congolense, Kafanchan stock, used in this experiment was obtained from NITR, Vom, Nigeria (Kafanchan/87/NITR/128). It was isolated in 1987 from 5 year old female zebu cattle No. 128 grazing along a cattle route South of Kafanchan and passaged in mice several times.

Experimental design

The goats were randomly divided into four groups. One comprised three West African dwarf (WAD) goats which served as experimental animals for the WAD breed. Each of the goats was injected with *T. congolense* organisms (1 ml x $10^{7.6}$) through the jugular vein. They were treated with Berenil[R] at dose rate 7 mg/kg body weight nine days after infection. The second group comprised three Red Sokoto (RS) goats as experimental animals. They were given the same treatment as above. The third and fourth groups each comprised two goats of WAD and RS breeds as uninfected control.

Plasma for determination of GOT and GPT was obtained from each animal prior to infection and on days 2, 4, 7 and 9 after infection. After treatment with Berenil[R] these factors were monitored twice weekly. Plasma was also examined by trypanosomal antigen ELISA prior to infection and daily from 2 to 9 days post infection. After treatment the test was done twice weekly. The haematocrit concentration technique was used for detecting trypanosomes in blood.

In all cases, analysis was carried out within 24 h of collection. The concentrations of glutamate oxalacetate transaminase (GOT) and glutamate pyruvic transaminase (GPT) were determined by the colorimetric method as described by REITMAN and FRANKEL (10). Antigen ELISA was carried out as descibed in FAO/IAEA ELISA kit for the diagnosis of *T. brucei, T. congolense* and *T. vivax* trypanosomosis (3).

Results

Details of the changes that occur in the plasma of goats in the course of the experiment are presented in tables I and II and figures 1 and 2.

Among the WAD goats the mean GOT values rose steadily from a preinfection value of 19.3 UI/l to 29.3 UI/l at 9 days post infection (dpi) (table I and fig. 1) as compared to consistent mean values for control goats. Following treatment with Berenil[R] the mean GOT values of infected goats failed to return to preinfection level.

Infected RS goats exhibited a similar rise in mean GOT values following infection with *T. congolense*, but the value rather continued rising after treatment with Berenil[R] (table II and fig. 1). Mean GOT values of infected WAD

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TABLE I Changes in the mean transaminases level in the plasma of West African dwarf goats during courses of infection with **T. congolense** *and after treatment with Berenil®.*

		Preinfection	Days post infection				Days post treatment					
			2	4	7	9	5	9	12	16	19	23
GOT (UI/l)	Infected	19.3 ± 1.15	24 ± 10.5	31.3 ± 11.0	30.6 ± 10.1	29.3 ± 10.1	34.6 ± 12.8	38 ± 0.0	37.3 ± 1.2	33.3 ± 4	36.3 ± 4.0	32.6 ± 1.1
	Control	20.5 ± 0.7	18 ± 2.8	20 ± 2.8	21 ± 1.4	21 ± 1.4	18 ± 0.0	22 ± 2.8	20 ± 0.0	16.5 ± 0.7	21.5 ± 0.7	19 ± 1.4
GPT (UI/l)	Infected	12.3 ± 0.6	14.6 ± 1.5	13.3 ± 3.1	15.3 ± 5.0	14.6 ± 3.1	22.6 ± 2.3	14.3 ± 4.9	13 ± 4.3	10 ± 2.0	14 ± 3.4	15.3 ± 4.2
	Control	16 ± 2.8	17 ± 1.4	17 ± 1.4	16 ± 2.8	10 ± 2.8	19 ± 9.8	17.5 ± 10.6	14.5 ± 7.7	13 ± 4.2	15 ± 4.2	15.5 ± 6.4

TABLE II Mean changes in the transaminases level in plasma of Red Sokoto goats during course of infection with **T. congolense** *and after treatment with Berenil®.*

		Preinfection	Days post infection				Days post treatment					
			2	4	7	9	5	9	12	16	19	23
GOT (UI/l)	Infected	23 ± 1.7	20 ± 4.0	36 ± 10.5	38 ± 6.0	40.6 ± 5.7	38 ± 6.0	40.6 ± 3	40 ± 4.0	34.6 ± 4.2	32 ± 3.4	29.3 ± 8.3
	Control	24 ± 5.6	20 ± 5.6	22 ± 2.8	25 ± 4.2	26 ± 8.5	25 ± 4.2	25.5 ± 2.1	26 ± 8.5	28 ± 11.3	25.5 ± 3.5	28 ± 5.6
GPT (UI/l)	Infected	7.3 ± 3.1	7.3 ± 2.6	9.3 ± 5.0	24.6 ± 9.0	23.3 ± 6.1	24 ± 6.9	13.3 ± 2.3	13 ± 2.6	10.3 ± 2.1	13.3 ± 8.3	11 ± 4.4
	Control	11.5 ± 0.7	6.5 ± 2.1	14 ± 2.8	17 ± 1.4	16.5 ± 0.7	17 ± 1.4	15.5 ± 6.4	15.5 ± 6.3	8.0 ± 0.0	11 ± 1.4	11 ± 1.4

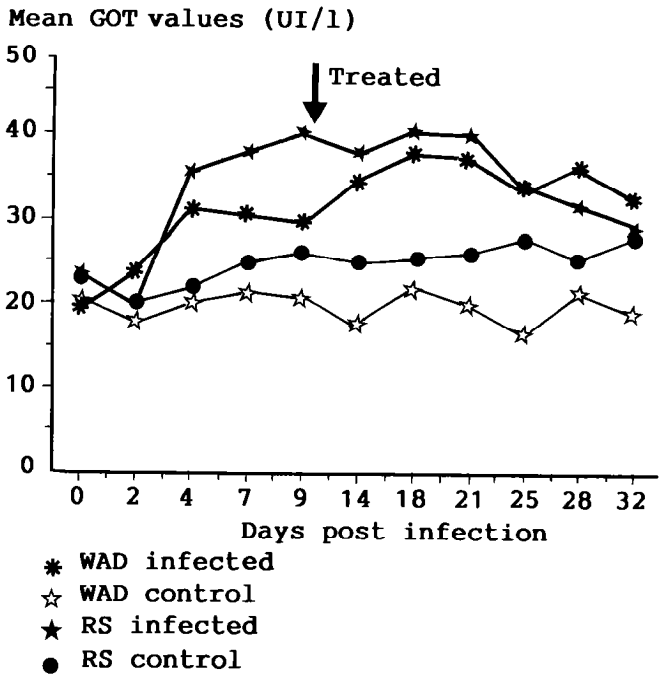

Fig. 1 : Mean changes in GOT values of goat infected with T. congolense *and after treatment with Berenil® (WAD : West African dwarf ; RS : Red Sokoto).*

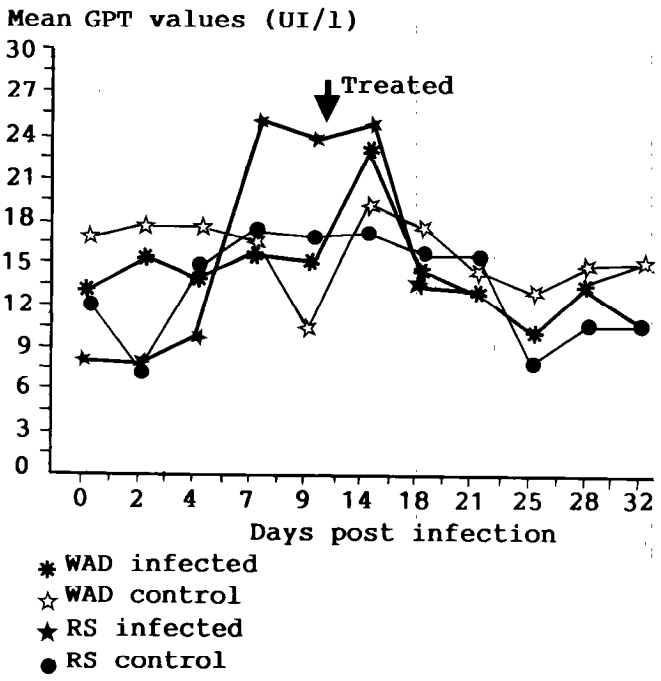

Fig. 2 : Mean changes in GPT values of goats infected with T. congolense *and after treatment with Berenil® (WAD, RS : see figure 1).*

goats were generally lower than that of infected Red Sokoto except at 2 dpi, 19 days post-treatment (dpt) and 23 dpt.

Mean GPT values were significantly different for infected and control WAD goats (table I and fig. 2). However, infected RS goats showed a sharp rise in mean GPT values to 24.6 UI/l at 7 dpi (fig. 2) which than fell gradually following treatment with Berenil^{R}. The value failed to completely return to preinfection level, even after the treatment.

Antigen ELISA revealed relapse infection on one infected WAD goat which continued to be positive for antigenaemia even up to 23 days after treatment with Berenil^{R}. Also plasma from one of the infected RS goats became positive for antigenaemia 19 days post treatment after it had become negative at 5, 9 and 12 days post treatment, indicating relapse infection.

Discussion

The current study has revealed increased GOT and GPT levels following experimental *T. congolense* infection in goats. This report agrees with an earlier finding in dogs (7) infected with *T. brucei* which penetrates tissues where these enzymes are located and cause their release. *T. congolense* on the other hand is haematinic (restricted to the blood vessels) only, and one wonders how these enzymes have been generated. They might be derived from haemolysed red blood cells or from the parasites themselves since the length of infection was too short for any significant tissue damage to have occurred. These observations (7, 9) have been made at 5 (12) and 8 days (1), equally too short a period for any significant tissue damage due to trypanosomosis. One observation in our study that demands further explanation is the failure of the transaminases to return to their preinfection levels within two weeks after treatment with Berenil^{R}. Upto 9 days post treatment when the difference in the level of the GOT was still statistically significant ($P < 0.05$) between the infected and uninfected WAD goats, antigenaemia was still detectable in the plasma. It is not likely that these enzymes came from the parasites or their antigens in circulation. It is noteworthy that even the increased values of these enzymes in the infected animals were still below or within the normal reference range (4).

Conclusion

There is an evident need to undertake a study to determine the level of transaminases in normal goats in this specific environment more especially for the fact that transaminases levels in West African dwarf goats were lower than in the Red Sokoto.

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Goats were experimentally infected with *Trypanosoma congolense* and then treated with Berenil^{R} after 9 days of infection. The infection produced increases in glutamate oxalacetate transaminase (GOT) and glutamate pyruvic transaminase (GPT) values. Mean GOT values in infected West African dwarf goats were generally lower than in infected Red Sokoto goats. Treatment with Berenil^{R} did not produce any significant effect on their levels probably because of the relapse infection recorded in this study. *Key words* : Goat - Trypanosomosis - *Trypanosoma congolense* - Transaminase - Nigeria.

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