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Effect of Chemotherapy on Liver Enzymes Levels in Nubian Goats Experimentally Infected with *T. evansi*

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Abstract: In twenty-five Nubian goats the effect of CymelarsanR and Oxytetracycline was studied. Twenty goats were infected with *T. evansi*. Serum Glutamic Oxaloacitic Transaminase(GOT), Glutamic Pyruvic Transaminase (GPT)and Alkaline Phosphatase (ALP) levels were increased post-infection. In Cymelarsan[R] and in the combination treated groups the normal level was reached in less time. They were restored to normal in the Cymelarsan[R] and in the combination treated groups.

Key words: Nubian goats, effect of chemotherapy, liver enzymes levels, infected with *T.evansi*

INTRODCUTION

Sudanese camels generation components are affected by the most important protozoan disease; trypanosomosis (Guffar) .The main pathogen in camels being *T.evansi*. Camels rarely enter tsetse belt, so the mechanical-transmitted infected by biting flies (Wilson, 1984).

The commercially drugs for animal trypanosomosis are limited. Treatment in camels is currently dependent on one of the two drugs suramin (Naganol, Bayer, AG) and quina- pyramine (Bujon, 1990).

Trypanosomosis may some times be associated with other infection such as internal parasites and bacterial infection. Of the commonly used antibiotic, tetracycline group is a broad spectrum, intoxic, bacteriostatic. It reach high concentration in the kidney, spleen, lung and liver (Water *et al.,* 1991). Trypanosomes could be found in liver, lung, skin, spleen, heart, kidney, brain, skeletal muscles, eye, testis, pituitary and epididymis (Losos and Ikede, 1970).

Infected *T.evani* animals showed clinical signs like nervous like nervous signs, bent back position and emaciation, pyrexia keratitis, lacrimation, diarrhea, weak respiratory and pulse rate and loss of body condition (Fairouz, 2000). Also it showed post mortum changes like, enlargement of spleen, liver, kidney, odema in lungs, serous atrophy of fat, hydro pericardium, pseudocyst, multifocal encephalitis and pseudocyst in cortexof cerebral and cerebellum (Fairouz, 2000).

Also many histopathological changes were observed (Fairouz, 2000) studies such as congestion in the heart, thyroid gland and in the central vein and sinusoidal focal fibrosis, increase in alveolar cellularity, alveolar haemorrhage and thickening of alveolar wall. Slight congestion in cerebellum and cerebral, pre-neural and pre-vascular odema, menengial congestion, capillary congestion and pre-vascular cuffing, dilation of kidney tubule, increase in glomeruli cellularity, haemorrhage, haemosidrosis, lymphocytes and lymphoid follicles with depletion of lymphocytes.

At the recommended dose: The liver is one of the most frequently damaged organs in the body and it is indeed fortunate that it has been shown that 10% of hepatic parenchyma is required to maintain normal liver function.(Robbins). The objective of this study is to test for clinical pahological changes as a reflection of liver dysfunction, alkaline phosphatase, glutamic oxaloacitic, glutamic pyruvic transaminase and bilirubin are the enzymes to check for this reason.

MATERIALS AND METHODS

Experimental animals: Animals used in the study were twenty-five healthy Nubian goats of both sexes, 8-12 months old.

Adaptation period: All animals were stabled in insect prove pens at the Department of Preventive Medicine and Public Health at the Faculty of Veterinary Medicine. They were fed on lucerne and millets and water was given *ad libitum* for two weeks.

Experimental period: The data for all groups was categorized into 3 periods:

* Pre-infection: Two weeks prior to infection.
* Infection: From day of inoculation to patency and treatment.
* Post-treatment: From treatment day to the end of experiment.

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The parasite: *T. evansi* was isolated from an infected camel at Elmewelh market. It was brought originally from Elgadarif- Eastern Sudan, which is confirmed as non-tsetse zone. The *T. evansi* isolate so obtained was designated as Gad tryp (1).

Drugs: Two drugs were used in this study:
1- Cymelarsan^{R}(Rhône-mèrieux-France).
2-Oxytetracycline (EMBAcycline*5) (Rhône-mèrieux-France).
Experimental Design
Animals were divided into five groups, five animals in each as follows:
Group (C) Uninfected- untreated.
Group (R) Infected- treated with Cymelarsan^{R}.
Group (O) Infected- treated with OTC.
Group (Z) Infected-treated with Cymelarsan^{R} and OTC combination.
Group (A) Infected- untreated group.
Group (C2) Uninfected- treated with the combination of the two used drugs.

Experimental inoculation: Each goat was inoculated intravenously with 0.75 mL blood of rat infected it contained (5 X 10^{5} organisms).

Blood values determination: Blood samples for parsitological methods were withdrawn from the jugular veins of all goats before and after infection and after treatment using a vacutainer system (Becton-Dickinson France) with an anticoagulant (Ethylene Diamine Tetra acetic Acid (EDTA).

Parasitological methods: The daily examination of standard wet blood film, thin film, thick film and Buffy Coat Technique (BCT) were done to determine the presence of trypanosomes in goats.

Blood collection: Blood samples for serum were withdrawn from the jugular veins of all goats pre and post-infection and after treatment using a vacutainer system (Becton-Dickinson.France).

Biochemical analysis: This was determined by colorimetric method using commercial kits (Randox laboratories Ltd. U.K.I and enzymatic colorimetric method using commercial kits (plastic laboratory product Ltd .U.K)

Glutamic oxaloacitic and glutamic pyruvi transaminase: Was determined according to Frankel and Reitman (1975) and Schmidt and Schmidt (1963) .

The serum bilirubin: Was determined according to Frankel and Reitman (1975).

The serum alakline phosphatase: The test was done according to Chemie (1972) and Mathieu (1980).

Statistical analysis: All data was computerized using MSTAT-C program (Michigan State University), for the analysis variance and for means separation.

RESULTS

Parasitological findings

Pre-patent period: Incubation period ranged between 4-9 days, seven out of twenty animals showed parasitaemina in 4 days.

Parasitaemia: Parasitaemia was variable between one per field to uncountable parasite (Table 1).

Course of infection: Death was frequently preceded by appearance of trypanosomes in the peripheral blood. In group (A) death began by the 2nd week, all animal died by day 20. The treated groups (group (R) and (Z) were found negative within 26 hours of drug inoculation and all animals, group (O) death began on day 47 and all animals died by day 54.

Slight increase was seen in Alkaline phosphatase after injection the combination in the control group(C2). Significant increased was seen post-infection. After treatment significant decreased was observed and it was normal at the end of experiment (Table 2).

Significant increase was seen in serum Glutamic Oxaloacitic Transaminase (GOT)value post-infection. After treatment it became normal, it was increased after injection with the combination (Table 2).

Serum glutamic pyruvic transaminase (GPT)value was increased significantly after injection the combination in group (C2), also post-infection. It was decreased after treatment in all treated groups (R), (O) and (Z) respectively and it was normal (Table 2).

Serum bilirubin value was increased significantly after injection the combination in group (C), also in group (R), (O), (Z) and (A) post-infection. It was decreased after treatment in all treated groups to normal level (Table 2).

DISCUSSION

Alkline Phosphatase (ALP) levels were increased post-infection which was contested by Barr *et al.* (1986) who reported that dogs infected with *T.cruzi* showed ALP decrease post-infection and agreed with Arowolo *et al.* (1988)

Alkline Phosphatase (ALP) levels were increased in control group after injection the combination, were decreased in Cymelarsan^{R} and Cymelarsan^{R} OTC treated groups after treatment.

Table 1: The Parasitaemia in the different groups

Groups	Animal No	Base - line	Days											
			4	7	10	13	16	19	26	33	40	47	54	61
C	1													
	2													
	3		-ve											
	4													
	5													
R	6		+	+	++	++++								
	7				+	++								
	8				+	+++					-ve			
	9				+	++								
	10				++	+++								
O	11		+	++	++	+++	+++	+++	+++	+++	++++	Died	Died	Died
	12			++	+	+	+	+	+	+	++	+++	Did	
	13	-ve		+	++	++	++	+	+	+	++	++	++	
	14			+	++	++	+	++	++	++	+++	+++	++++	
	15			+	++	+	++	++	++	++	++	++	+++	
Z	16		+	++	+++	++++	++++							
	17			+	+	+	+							
	18			++	++	++	++				-ve			
	19			+	+	++	+++							
	20			++	++	++	++							
A	21		++	+++										
	22		++	+										
	23		++	++					Died					
	24		++	+										
	25		+	++										
C2	26													
	27													
	28		-ve											
	29													
	30													

Parasitaemia grade: 1-3 =+, 3-5=++,5-10=+++ and above 10=++++

Table 2: The mean ±SE of serum Alkaline Phosphatase (ALP), Glutamic Oxaloacitic Transaminase (GOT), Glutamic Pyruvic Transaminase (GPT) and total bilirubin in Nubian goats infected with *T. evansi*

Parameter/ Group	ALP	GOT	GPT	Total bilirubin
Group(C1)	7.79±0.013 [a]	35.9 ±0.120 [a]	14.5±0.022 [a]	0.55±0.002 [a]
Group(R)	8.683±0.011 [a]	36.2±0.100 [a]	15.5±0.051 [a]	0.65±0.001 [a]
Group(O)	8.274±0.001 [a]	38.2±0.001 [a]	16.5±0.031 [a]	0.65±0.007 [a]
Group(Z)	7.274±0.012 [a]	36.5±0.030 [a]	15.8±0.011 [a]	0.68±0.006 [a]
Group(A)	12.847±0.011 [b]	48.9 ±0.021 [b]	22.6±0.018 [b]	1.86+0.004 [b]
Group(C2)	8.819±0.0158 [a]	40.2±0.033 [ab]	19.5±0.012 [ab]	1.05±0.002 [ab]

The different letter in one column showed the significant changes p=0.05

The OTC treated group remained at the same level post-infection and after treatment. Arowolo *et al.* (1988) reported that an elevated serum ALP is an indication of obstructive jaundice. Treatment with combination improved the depressed hepatic function more quickly than Cymelarsan^{R} alone.

The mean glutamic oxaloacitic (ALT) and glutamic pyruvic (AST) transaminase levels of the infected goats were increased significantly. This agrees with Aliyu *et al.* (1997). And bilirubin levels of the infected goats also were increased significantly.

The increase in bilirubin, AST, ALTand ALP as observed in infected goats indicated pathological conditions of the liver (Cornelius and Kaneko, 1963). Decrease after treatment indicating less damage of the liver. The transaminases ALT and AST are confirmatory tests in the viral hepatitis in the early stages of the illness, by the dramatic elevation of their levels. Serum bilirubin becomes abnormal at later stage than the transaminases. The serum transaminases activities, on the other hand are sensitive indicator of the liver cell damage and are raised in active exacerbation of the disease (Wilkinson, 1962). AST activity is high in the liver of most species, but it is also present in considerable amounts in many other tissues including skeletal muscles (Boyd, 1962).

The histopathological pictures demonstrated less damage in all treated groups. Increase in bilirubin suggested that bilirubiaemia may result from hepatocellular dysfunction. Almost definitely suggestive of protection of the structure integrity of the hepatocyte cell membrane or regeneration of damaged liver cells by the Cymelarsan^{R} and Cymelarsan^{R} OTC. The increase of ALP level is another measure of liver

damage (Cornelius and Kaneko, 1963). Which occurs due to the denvo synthesis by the liver cells.

The decrease in ALP might have occurred by decrease in denvo synthesis or by feed back mechanism (Cornelius and Kaneko, 1963). The liver participate blood disorder by virtue of its function as a reticuloendothelial organ, its role in the metabolism of blood proteins and the storage of the antipernicious anaemia factor (Frankel and Reitman, 1963) so there was significant decrease in levels of haemoglobin and erythrocytes (Fairouz, 2000).

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