Thyroid Hormones Disturbances during Experimental Infection of *Trypanosoma Evansi* in Goats

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**ABSTRACT**

Thyroid gland dysfunction was studied in goats experimentally infected with *T. evansi* based on the levels of serum triiodothyronine (T₃) and thyroxin (T₄) and thyroid stimulating hormone (TSH). The infected goats were treated with either Trimoxazol alone or with Quinapyramine and the combination of these two agents. The groups were G1: Uninfected control (negative control); G2: Infected untreated control (positive control); G3: Infected and treated with Sulfamethoxazol; G4: Infected and treated with Quinapyramine; G5: Infected and treated with combined Quinapyramine and Sulfamethoxazol. After six months of treatment, blood samples from the goat of each group were taken and serum was separated by centrifugation. It was found that T₄ concentration decreased significantly in goats in group 2, 4 and 5. Similarly, concentration of T₃ concentration decreased significantly in treated groups (with the exception of G1). Almost similar trend was also found in TSH concentration in treated groups with significant reduction in G2.

**Keywords:** Nubian goats, Thyroxin, Tri-iodothyronine, Trypanosoma evansi

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**INTRODUCTION**

Animal trypanosomiasis constitutes a major threat to food security in several parts of the world. *T. evansi* causes a disease in camel referred as Surra (Uilenberg, 1998). In Sudan, the infection is known as Gufar. Death may occur in a few months, but few camels may die in two to three weeks (Soulsby, 1986). Decreased productivity and mortality due to *T. evansi* infection in camels have been described under natural and experimental conditions in many parts of the world (Mochoba et al., 2006). Clinical symptoms include acute bouts of fever, dullness, lack of appetite and lacrimation with peaks of high parasitaemia, oedema may occur and pregnant animals often abort. The most important mechanical vectors of Surra in camels are Tabanids and Hippoboscids (Uilenberg, 1998).

The Thyroid gland is one of the endocrine organs, which is affected during trypanosomosis (Abebe and Eley, 1992). Chronic infection impairs the function of thyroid gland in goats as defined by considerable plasma thyroxin decrease (Mutayoba et al., 1988). *T. evansi* infection in camels causes hypothyroidism associated with decrease in triiodothyronine (T₃) and thyroxin (T₄). The decrease in T₃ and T₄ coincides with anaemia which is the major pathological manifestation in chronic trypanosomosis (Lomo et al., 1995). It is also accompanied by parallel decrease in the level of blood pituitary thyrotropic hormone (TSH) as reported by Al-Garawi et al. (2001). The objective of the present study was to find the effect of trypanosomiasis on the blood thyroid hormones level in goats.

**MATERIALS AND METHODS**

Twenty five goats of local breeds were brought from Abozaid market, west Omdurman town. They were kept in well ventilated and naturally illuminated housing units at the Department of Preventive Medicine, Faculty of Veterinary Medicine. The animals were mixed sexes and their ages ranged between seven months to one year at the beginning of the experiment. All goats were screened for natural infections and treated for internal and external parasites. Blood film examinations were negative for trypanosome infections or any other blood parasites.

Five Swiss albino rats were obtained from the laboratory Animals Unit of the Central Veterinary Research Laboratory, Soba. They were used for the propagation of the *T. evansi*. The infected blood of those rats was used to infect goats used in this study. Healthy goats of mixed sex were divided into five groups. G1: Uninfected control (negative control) G2: Infected untreated control (positive control) G3: Infected and treated with Sulfamethoxazol G4: Infected and treated with Quinapyramine G5: Infected and treated with combined Quinapyramine and Sulfamethoxazol
The experiment was run for 6 months. At the end of the experiment, the blood was collected from each group of animals and was centrifuged at 690 × g for 10 minutes. Serum was separated and stored at -20°C until analysis. The quantitative determination of T3, T4 and TSH was determined as described by Lee et al. (1987). The mean of different groups was compared as described by Steel et al. (1997).

RESULTS

The results indicated that T4 was significantly high in group 1 and 3 while T3 was significantly high in group 2. In contrast, TSH was significantly low in group 2 and high in group 1.

| Table 1: The mean ± SE of serum thyroxine, triiodothyronine and thyroid stimulating hormone in goats infected with T. evansi |
|-----------------|----------------|----------------|
| Thyroxine (T4)  | Triiodothyronine (T3) | TSH |
| Group 1 98.4±0.02a | 1.8±0.00a | 1.4±0.02a |
| Group 2 47.4±0.2b | 3.6±0.02b | 0.2±0.01b |
| Group 3 84.6±0.1b | 2.3±0.01b | 0.9±0.02b |
| Group 4 67.5±0.2b | 2.1±0.01b | 0.7±0.02b |
| Group 5 72.6±0.1b | 2.4±0.01b | 0.6±0.03b |

G1: Uninfected control (negative control); G2: Infected untreated control (positive control); G3: Infected and treated with Sulfamethoxazol; G4: Infected and treated with Quinapyramine; G5: Infected and treated with combined Quinapyramine and Sulfamethoxazol; the different letters in the columns showed the significant changes. P ≤ 0.01

DISCUSSION

The possibility of primary hypothalamic pituitary dysfunction during trypanosomosis has been indicated by hormonal imbalance related to thyroid hormonal pathway (Mutayoba, et al. 1998). The result obtained for T4 showed an increase when animals were infected with T. evansi. This result agreed with that of Fatihu et al. (2009) who reported that Zebu cattle infected with T. vivax showed a decrease in the level of T4. Similar results were also reported by Fairowz et al. (2007). Also Mutayoba et al. (1988) reported decrease in the level of T4 with T. evansi infection in goats. On the other hand, T3 showed increase in infected sheep followed by slight decrease after treatment. The results T3 differ from the findings of Al-Garawi et al. (2001) who reported that T3 and T4 and TSH blood levels decreased due to T. evansi infection in camels.

Conclusion

It was concluded that trypanosomosis due to T.evansi in goats has effect on the thyroid hormones and that the thyroid dysfunction could explain the weakness exhibited in the infection. Yet treatment with trypanocidal drugs can protect against expected thyroid damage.

REFERENCES


