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Short Communication

Biochemical changes in sleeping sickness serum samples detected by CATT in Sudan

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Biochemical analysis on 48 serum samples included positive and negative samples using Card Agglutination Test for Trypanosomiasis (CATT) from Bahr El –Jebel state and Eastern Equatorial state were done and analyzed using t- test. The concentration of total serum proteins and serum globulins increased in positive case of sleeping sickness using Card Agglutination Test for Trypanosomiasis (CATT) (*P*=0. 004, *P* < 0.05 , respectively). But no changes were observed in serum ions measurement (sodium, potassium, calcium, and zinc); (*P*=0. 371, *P*=0.111, *P* =0.744>: *P* 0 > 05 respectively).

Keywords: Biochemical changes, Trypanosomiasis, CATT, Serum proteins, Serum Ions.

INTRODUCTION

Trypanosome in Africa is still one of the most serious threats to man's health and a serious obstacle to the development of agricultural industry. In Sudan, trypanosomes had been recognized as an important disease of livestock, since 1904 and 1908, when the first report of the disease was recorded in the country. In human, the disease was first recorded from Nimuli in 1915. The disease, in Sudan, had been predominantly of the *Trypanosome brucei gambiense* and has always been maintained by the vector of group of flies particularly *Glossina fuscipes*,the major vector of *Trypanosome brucei gambiense* (Hutchinson, 1975; Snow, 1983).

The aim of this study was to try to find significant differences between positive and negative cases by Card Agglutination Test for Trypanosomiasis (CATT) and some biochemical changes to improve the diagnosis of human African trypanosomes (HAT).

MATERIAL AND METHODS

Serum were collected from humans (general population according to their willingness) from Bahr El Jebel and Eastern Equatorial states then analyzed using Card Agglutination Test for Trypanosomiasis (CATT) (Table 1) (Magnus et al., 1978) and divided into two groups the first one was positive reaction and the second was negative reaction, 24 samples from each group was analyzed biochemically to measure some parameters and compare them.

Total serum proteins: These were determined by the use Of the Biuret reagent as described by (Weichselbaum, 1946).

Serum albumin: This was determined by the use of the Bromocresol green (B.C.G) reagent as described by (Kertman, 1971).

Serum globuli: This was determined by subtraction of albumin from the total proteins, it was calculated and expressed as gm/100ml.

Serum calcium and zinc: This was determined by atomic absorption spectroscopy as described by (Willis 1960, Dawson 1969) respectively.

Serum sodium potassium concentration: Were determined by 0.1 ml of serum was diluted with 9.9 ml of distilled water and mixed well. The high standard was used to adjust the instrument to 100 (full scale, then the diluted sample and the low standard were read).

Data analysis

Data were analyzed statically by using t-test and was

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Table. 1 Biochemical Changes in serum samples from Bahr E-IJebel and Eastern Equatorial state.

Concentration	Mean of +ve cases	Mean of-ve cases
Total serum proteins g/100ml	9.4083 [a]	7.6333
Serum Albumins g/100ml	6.2667	6.3667
Serum Globulins g/100ml	3.1417 [a]	1.2667
Serum Sodium m Eq /L	69.5625	72.4208
Serum Potassium m Eq /L	1.04171	1.1708
Serum Calcium mg 100 ml	7.6750	7.9083
Serum Zinc Mg / 100 ml	-0.2458	-0.9917

performed using SPSS 12.0. T – test was used to measure differences between two samples means at $P < 0.05$, the difference was statistically significant.

RESULTS AND DISCUSSION

- ***Total protein:*** the average of the total protein levels show significant changes between positive and negative cases ($P < 0.05$,) the mean increase in positive cases
- **Albumin**: the level of albumin did not show significant changes in positive and negative cases ($P < 0.05$). The average increases in positive while decreases in negative cases were observed.
- **Globulin:** The average level of globulin showed significant changes between positive and negative cases ($P < 0.05$). The mean increases in positive while decrease in negative cases.
- **Serum sodium (Na^+):** The average values of sodium showed no significant changes was found between positive and negative cases ($P > 0.05$).
- **Serum potassium (K^+) :** The average values of potassium showed no significant changes was found between positive and negative cases ($P > 0.05$)
- **Serum calcium (Ca^{++})**: The average values of calcium showed no significant changes was found between positive and negative cases ($P > 0.05$)
- **Serum zinc (Zn^{++}) :** The average values of zinc showed no significant changes was found between the cases ($P > 0.05$); [a] indicates ($P < 0.05$).

A number of biochemical tests for *Trpanosoma evansi* infection which depend on increased serum globulin content had been described. These include the mercuric chloride test (M CT) (Bennett 1929). The formal gel test (FGT) (Planturex, 1923) and the thymol turbidity test (TTT) (Abdel 1960). These methods were not specific for trypanosomiasis and were not sufficiently reliable for accurate diagnosis (Pegram and Scott 1976, El malik 1976, Hakimdar 1987, Oshak 1988). The second stage infection of human African trypanosomiasis (HAT) is characterized by an increase in the protein content of cerebrospinal fluid (>37 mg / 100 ml) as measured by the by the dye binding assay (WHO, 1998). The trypanosome infections are genially characterized by anemia, leucopenia, thrombocytopenia, as well as biochemical changes such as hypoglycemia, elevated blood urea and hyperglobulinaemia (Anosa, 1988). Despite the variations in hosts (man, domestic and experimental animals) and trypanosomes, the severity of the hematological and biochemical changes associated with various host parasite combination is determined by the infection. Sleeping sickness is characterized by three stages, the chancre is primary lesion at the site of the infection (seldom in *T. b. gambiense* disease). haematolymphatic, and meningoecephlitic stage. The pathological lesions that arise during the haematolymphatic stage (e.g. anaemia, immuno-depression and IgM and IgG hyperglobulinaemia) only partly correlates with the level of parasitaemia (WHO, 1988; Lejion et al., 1999) detected light subunit microfilament (NFL) and glial fibrillary acidic protein (GFAP) in cerebrospinal fluid of patients with T.B. gambiense .That was the first time that neuronal damage in human Africa Trypanosomiasis (HAT) was demonstrated by using biochemical markers of brain damage in the cerebrospinal fluid (CSF).

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