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Assessment of Level of Cortisol Hormone in Patients with Toxoplasmosis

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Abstract: ***Objective: to estimate serum level of cortisol in patients with toxoplasmosis. Materials and Methods: A case control study was conducted in Military Hospital in 150 subjects, during the period from April to June 2015. The studied population consisted of 100 patients already diagnosed as toxoplasmosis patients (58 male and 42 female) as cases and 50 apparently healthy individuals (32 male and 18 female) as controls. After complete fasting, five ml of blood samples were collected and sera separated by centrifugation at 4000 rpm. The cortisol levels were accurately using automated hormonal analyzer. Results: We found significantly increasing in serum cortisol levels in toxoplasmosis patients as compared to control (p=0.000). No statistically significant correlation observed between levels of serum cortisol in male cases and female cases (p=0.798). Conclusion: toxoplasmosis is associated with higher serum cortisol levels.***

Keywords: Toxoplasma infection, cortisol, Military Hospital, Sudan

1. Introduction

Toxoplasma gondii is an intracellular protozoan parasite that infects human and animals. Infection by toxoplasma gondii is widely prevalent in human and animals throughout the world, and of both veterinary and medical importance, because it may cause abortion, fetal death, and stillbirths in its intermediate hosts.

Although toxoplasmosis is a cosmopolitan infection, the disease appears to be overshadowed in the tropics by other endemic diseases like malaria and enteric fever. With the realization of toxoplasmosis as an opportunistic infection in AIDS, renewed interest has emerged in the epidemiology of toxoplasmosis in Africa. Recent surveys have shown wide variations in the prevalence and epidemiologic pattern of toxoplasmosis in different African countries (Somalia 43.6%, Mauritania 14.5%, kenya 54%, Negeria 58.9% , libya 52%, Burundi 41.1% , Niger 18.2%) in the Sudan, the only information available on the prevalence of toxoplasmosis dates back to 1966 (Carter &Fleck 1966).

This parasite has been reported to cause four types of disease. The most dangerous is congenital toxoplasmosis, which often results in serious damages to fetus and development of various symptoms like micro-cephalic, hydro-cephalic and mental problems in infants The Second form is acute postnatally acquired toxoplasmosis. This form recognized by the presence of tachyzoite in blood and other tissues. A wide range of clinical symptoms like cervical lymphadenopathy, fever, headache, and psychiatric and neurological complications can be found in immunocompetent patients. But symptoms of acute toxoplasmosis are usually mild and harmless. Accordingly, toxoplasmosis is usually misdiagnosed with bacterial or viral diseases.

Lower cellular immunity which is associated with high levels of steroid hormones contributes to the survival of the parasite in the body. Such these people, cause of steroid hormones increase with weak immune system, contribute to this parasite survive in body.

Regarding, the above report, it seems that there is a relationship between infected individuals by toxoplasmosis and stress hormones increase. It must be noted that stress hormones increase can lead to behavioural challenges in individuals. The aim of this study is to evaluate effect of toxoplasma infection on cortisol level.

2. Materials and Methods

This was a prospective case control study conducted in military hospital in Khartoum during the period from April 2015- June 2015. The case group was composed of 100 patients with toxoplasmosis while the control group was composed of 50 apparently healthy individuals.

A coded enrollment number was given for each enrolled subject. The data were collected by using a direct interviewing questionnaire. Medical information was collected from the patients. The questionnaire was used to collect data regarding name, age, gender and stress.

Five ml venous blood were collected from each enrolled subject at 8:00 am after adequate fasting and poured into plain containers to collect serum by adequate method. Sera obtained were analyzed for cortisol using Roche and Hitachi E411 analyzer (Germany), which is fully automated Elecrto-chemiluminescense anlyzer.

The data were analyzed using the statistical software package SPSS, version 20.0.

3. Result

The participants included were 150. Of them, 100 were toxoplasmosis patients (58 male and 42 female) as cases and

50 apparently healthy individuals (32 male and 18 female) as controls. The statistical findings showed that serum levels of cortisol in toxoplasmosis patients were significantly higher than those of control [M±SD = 643.07 ± 123.5 nmol/l] (P. 0.000).

There is no statistical significant difference in the serum levels of cortisol between toxoplasmosis females (M±SD = 646.8 ± 114.9 nmol/l) compared to males [M±SD = 640.3± 130.3 nmol/l] (P. 0.798).

Table 1: Showed the level of Cortisol between toxoplasmosis patients and control

	N	Mean	Std. Deviation	P. value
Patients	100	643.07	123.54	0.000
Control	50	323.60	129.16	

Independent Samples Test

		t-test for Equality of Means				
		t	df	Sig. (2-tailed)	95% Confidence Interval of the Difference	
					Lower	Upper
result	Equal variances assumed	14.705	148	.000	276.53690	362.40310
	Equal variances not assumed	14.487	94.312	.000	275.68577	363.25423

Table 2: Showed the comparison Cortisol level between Male toxoplasmosis patients and Female patients

	N	Mean	Std. Deviation	p-value
Male	58	640.3621	130.30729	0.798
Female	42	646.8095	114.99825	

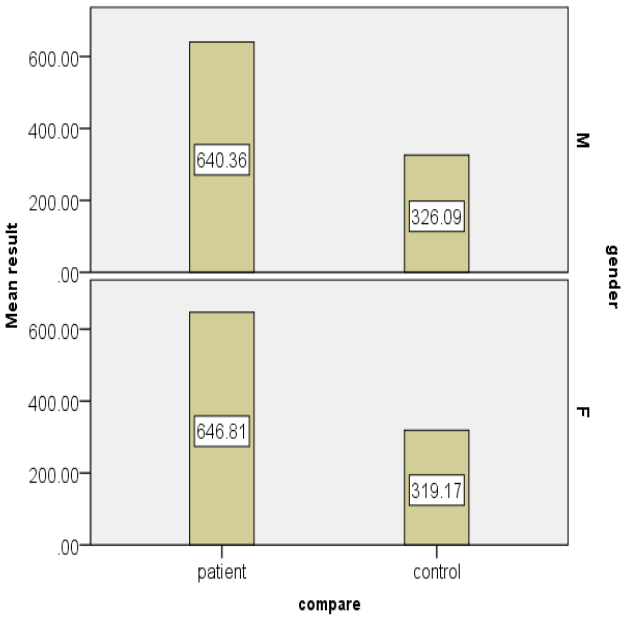

Figure 1: The level of Cortisol between toxoplasmosis patients and control

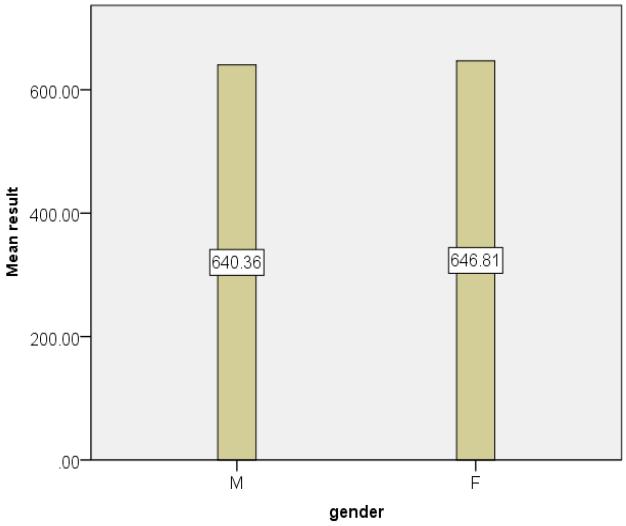

Figure 2: The comparison Cortisol level between Male toxoplasmosis patients and Female patients

4. Discussion

The present study is conducted for exploring the relation between *Toxoplasma* infection and stress changes and stress hormones. Our study demonstrated that there is a significant correlation between cortisol hormones levels and toxoplasma infection.

Toxoplasma is one of the almost widespread parasite diseases common between human and warm-blood animals, which is widely distributed around the world. africa also, its prevalence is different in various countries; Somalia 43.6%,Mauritania 14.5%, kenya 54%,Negeria 58.9% ,libya 52%,Burundi 41.1% ,Niger 18.2% [2] , in warm weather and lowlands is more widespread than mountains. The main ways of parasite and *Toxoplasma* infection transmission is consuming raw or semi cooked meat infected with *T. gondii* [6-7], or infected cat feces, and also congenital through placenta to fetus [8-9], drinking unpasteurized milk and even blood transfusion, transplantation and semen reception [10].

Our research results indicated that there is a direct relation between *Toxoplasma* infection and cortisol increase in blood plasma.

Results indicated that cortisol titer in the infected individuals is higher in both infected men and women than uninfected ones. Cortisol increase is a symptom of significant stress in a person, and in case it lasts for a while, it will lead to stress-induced behaviours and anxiety. On the other hand, this hormone titer increase can damage different parts of nervous system. Based on the present research findings, no significant relation was observed between this parasite infection and patients age. Previous study(shahnaz shirbazu,laila,fatemeh,2010) demonstrate there is significant correlation between stress hormone level and excessive stress and toxoplasma infection

5. Conclusion

It is concluded that *Toxoplasma* infection increase cortisol level. Besides, since it is probable that parasite presence in the body leads to blood cortisol increase, it is suggested that its accuracy be explored in the next researches.

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