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RESEARCH ARTICLE

DETECTION OF LTH, FSH AND LH HORMONE LEVEL IN PREGNANT WOMEN INFECTED WITH *TOXOPLASMA GONDII*

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ABSTRACT

Infection with the protozoan parasite *Toxoplasma gondii* is widely prevalent in humans and animals. Infection with *Toxoplasma* may associate with miscarriage in many pregnant women due to infection. In this study, the level of lutetropic hormone (LTH), follicle-stimulating hormone (FSH) and luteinizing hormone (LH) was measured in pregnant women suffering from toxoplasmosis using mini-VIDAS® technique. Results showed that pregnant women have high concentration of both LTH and FSH hormone(10.80 ± 6.53) ng/ml and (9.51 ± 2.40) µIU/ml respectively, while the concentration of LH hormone was lower than normal(4.49 ± 0.56) µIU/ml. Such finding is to suggest that infection with *T. gondii* is interfering with these hormones in pregnant women.

INTRODUCTION

Toxoplasmosis, caused by *Toxoplasma gondii*, is worldwide in distribution and is most common in warm, moist areas. It has been reported from man, pigs, sheep cattle, horses, dogs, cats and other domestic animals, as well as rodents, wild carnivores, and birds (Nobel & Nobel , 1982). *T.gondii* is generally initiated by ingestion either the tissue cyst stage, found in the meat of infected animals, or the oocyst stage, released in the feces of infected cats (Zeibig , 1997). Adult-acquired toxoplasmosis is normally mild to asymptomatic, but disease can be severing in the immunosuppressed (Araujo & Remington,1987).In addition, the ability of sex and pregnancy-associated hormones to influence the severity of *T.gondii* infection is of particular public health interest due to the ability of the parasite to cause congenital disease if infection occurs during pregnancy, moreover, female is more vulnerable than male to infection by *T. gondii* and the susceptibility to pathogens also varies according to the stage of the menstrual cycle in non-pregnant women and varies according to stage of gestation in pregnant women (Styrt & Sugarman , 1990 ; Roberts *et al.*, 2001).

The cyclic changes in ovaries controlled by two hormones secreted by the anterior pituitary gland called gonadotropins (follicle stimulating hormone "FSH" and lutienizing hormone "LH") (Antony & Thibodeau, 1983). Another hormone secreted by anterior pituitary gland is LTH, a 24 kDa hormone plays role in proliferation and stimulation of milk secretion (Filisetti & Candolfi, 2004).Our study is to determine the concentrations of LTH, FSH and LH hormones in pregnant women with toxoplasmosis.

MATERIALS AND METHODS

Subjects and samples collection

This study was carried out on 28 pregnant women attending private clinics of gynecology in Baghdad between April and June 2011. Age considered was between 20 and 31 years (mean age 26.35 years, SD=3.42), women were in the 1st to 4th initial months of their pregnancy period.

Blood was collected from patients and each sample was used to screenanti- *Toxoplasma* IgG and IgM by ELISA technique, and also used to measure the LTH, FSH and LH hormones.Serum was separated by blood centrifugation at 3000 rpm for 5 minutes. Samples stored in -20°C.

Anti-Toxoplasma screening

Serum was screened for specific anti-toxoplasma IgM and IgG antibodies using ELISA kit (Biokit, Barcelona, Spain) according to the manufacturer's instructions.

Hormone level

Serum LTH, FSH and LH concentration was measured using mini-VIDAS® (Human Company, Germany).

Study groups

According to Anti-Toxoplasma IgG and IgM, samples were divided into two groups:

Group I: this group contains 14 pregnant women infected with *T.gondii*, age between 20-31 years old (mean age 26.42 years, SD=3.43).

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Group II: this group contains 14 healthy pregnant women (control), age between 20- 31 years (mean age 26.28 years, SD=3.53).

Statistical Analyses

Data were analyzed with the t-test to evaluate the possible differences between the study groups,*P* value < 0.05 was considered significant. The data was analyzed using SPSS statistical software (10^{th} version).

RESULTS AND DISCUSSION

The current study was done to detect the level of LTH, FSH and LH in pregnant women infected with *T.gondii* (Group I) the results were compared with healthy pregnant women (Group II). Results showed that the LTH level in group I was higher than that of group II, which was (10.80 ± 6.53) ng/ml and (7.81 ± 6.66) ng/ml respectively (Fig.1) , as well as no significant differences was detected between these two groups ($p<0.05$).

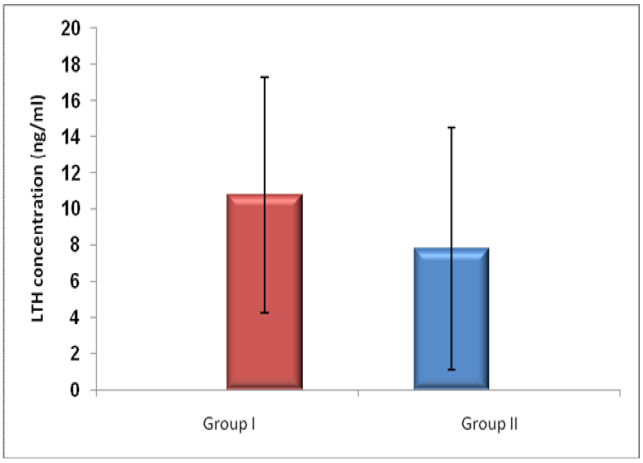

Fig.1 LTH hormone level in group I and II (ng/ml)

These results agreed with some studies which showed that high levels of some hormones have been associated with lower cellular immunity (Roberts *et al.*, 2001; Schuster & Schaub, 2001). Previous studies showed that sero-prevalence of *T.gondii* woman antibodies with hyperprolactinemia , hypoprolactinemia and control group (normal LTH) showed that women with hyperprolactinemia showed lower sero-prevalence than those with normal LTH, suggesting that high level of LTH may be one of the important factors preventing *T. gondii* infection in women(Dzitko *et al.*, 2008).These differences may explain that the LTH level which illustrated in our study may not reach the threshold concentration which interact with immune system and inhibits *T.gondii* proliferation, this explanation was based on findings as previously described (Dzitko *et al.*, 2010) who showed no statistically significant changes in the intensity of parasite proliferation in the host cell for a wide range of the LTH hormone concentrations.

Group I also showed high level of FSH hormone (9.51 ± 2.40) µIU/ml compared with group II which showed low level (1.31 ± 0.83) µIU/ml of this hormone (Fig.2), statistical analysis showed significant difference between these two groups ($p<0.05$), some sex hormones in high concentration correlate with low immune response, and increase the susceptibility towards parasitic infection as well as low or normal concentration of some sex hormones correlate with resistance against parasitic infection (Klein , 2004). These results were similar to the results of (Oktenli *et al.*, 2004) who showed that IL-1beta level was found to be higher in group of *T.gonii* infected patients with low sex hormone levels.

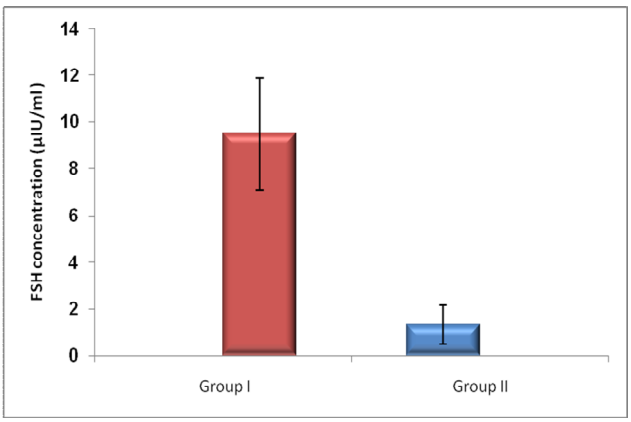

Fig. 2 FSH hormone level in group I and II (µU/ML)

The current study showed that pregnant women with toxoplasmosis have low level of LH hormone compared with high level of LH in healthy pregnant women which was (4.49 ± 0.56) µIU/ml and (13.64 ± 13.1) µIU/ml respectively (Fig.3) , statistical analysis showed significant differences ($p<0.05$) between these two groups , our findings indicate that infection with *T.gondii* may not lead to an increase in LH , these agreed with the findings of (Rui *et al.* ,2009) who showed that there were not obvious changes in LH hormone in mice infected with *Toxoplasma*.

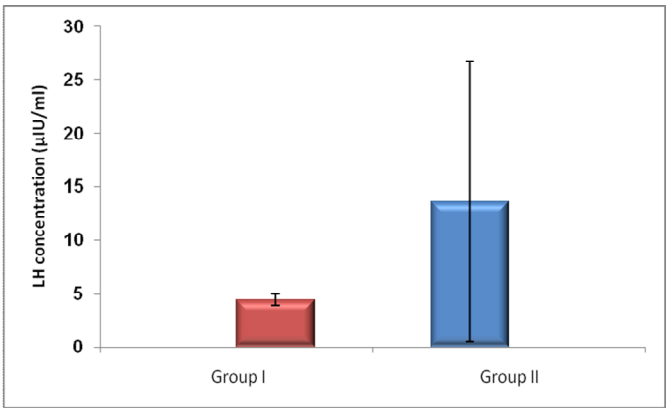

Fig.3 LH hormone level in group I and II (µU/ml).

It can be concluded that infection with *T. gondii*in pregnant women may lead to fluctuations in sex hormones during pregnancy and we can recommend future studies to detect the direct influence of the parasite on female sex hormones.

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