Co-Relationship between some Sex Hormones and pregnant women who Infected by Toxoplasmosis in Al-Qadisiyah Province

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Abstract

Toxoplasma gondii is a widely prevalent in human and vertebrate animals. A great range effects of toxoplasmosis has been studied, but there are still unknown aspects which must be explored. The present study investigates some changes in testosterone, follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels in pregnant women with toxoplasmosis using MINI-VIDAS technique. A total number of 125 positive toxoplasmosis pregnant women and 50 healthy pregnant women were involved. The results showed that pregnant women with Toxoplasmosis revealed non-significant high levels of testosterone and LH (0.40 ng/ml, 1.66 mIU/ml) respectively, and non-significant low levels of FSH (1.28 mIU/ml) in compared to non toxoplasmic pregnant women (0.35 ng/ml, 1.50 mIU/ml, 2.11 mIU/ml). These findings suggested that chronic infection with T. gondii has no association with significant changes of these hormones in pregnant women.

Keyword: Toxoplasmosis, Toxoplasma gondii, testosterone, FSH and LH.

1. Introduction. Toxoplasmosis is one of the most common zoonotic diseases that has infected approximately one-third of the world’s human population (1)in the moist areas, and has been reported from man, pigs, sheep cattle, horses, dogs, cats and other domestic animals, as well as rodents, wild carnivores, and birds (2). Infection with T.gondii is generally initiated by ingesting either the tissue cyst stage, found in the meat of infected animals, or the Oocyst stage, released in the feces of infected cats (3). Adult acquired toxoplasmosis is normally mild to asymptomatic, but disease can be severe in the immunosuppressed (4).Numerous epidemiological and clinical studies have noted differences in the incidence and severity of parasitic diseases between males and females. Moreover, a direct role for sex hormones was demonstrated in experiments which found that gonadectomy increased resistance.

Although the incidence of T. gondii infection was similar in males and females, disease manifestations varied according to gender and age (6). In those under 15 years of age, lymphadenopathy was more frequently observed in males than in females. However, in sexually mature adults (over 25 years of age), lymphadenopathy was more frequently observed in females (6, 8). The prevailing hypothesis for immunological differences between the sexes is that sex hormones, in particular, testosterone, influence on immune system (9). The localization of sex hormone receptors in immune cells, including lymphocytes, macrophages, granulocytes, and mast cells, illustrates that there are direct connections.
between the endocrine and immune systems and that endocrine factors can directly modulate the expression of target genes in immune cells (9).

Latent toxoplasmosis is known to influence the morphology of infected persons and also increases the probability of the birth of male offspring in both humans and mice. All these traits can be related to the observed differences in the concentration of testosterone between Toxoplasma-infected and Toxoplasma-free subjects. However, it is not possible to decide, using the Toxoplasma-human model, whether toxoplasmosis influences the level of testosterone in the infected host or whether individuals with different levels of testosterone vary in the probability of toxoplasma infection (8, 10).

During pregnancy, maternal hormones alter the immune responses of the mother in the presence of fetal antigens. Two hormones secreted by the anterior lobe of pituitary gland called gonadotropins (follicle stimulating hormone “FSH” and lutienizing hormone “LH”) are pregnancy associated hormones that control the cyclic changes in ovaries (15). The increases in the susceptibility to infection and a diminished proinflammatory response have critical anti-parasitic properties that cause an unfavorable development of toxoplasmosis (11, 5, 12, 13). 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 (14, 5). The aim of the study is to demonstrate if there is a relationship between toxoplasmosis infection and the level of some sex hormones in the study group.

2. Materials and methods. 125 samples (46 first trimester, 66 second trimester and 13 third trimester) of seropositive IgG antibodies of pregnant women with history of one or two previous abortions as a patients group and 50 (22 first trimester, 18 second trimester and 10 third trimester) seronagative IgG as a controls group (previously identified by Minividus method) were included for the estimation of testosterone, FSH and LH concentrations. These samples were obtained from the Maternity and Pediatrics Hospital in AL-Dywaniah province. Their ages were 27.52 ± 6.54 with a range of 15-40 years for patients group and 24.79 ± 5.70 with a range of 15-40 years for controls group.

Samples Collection. Venous blood samples, about 3 ml were collected from pregnant women in plane tubes. After clotted blood at room temperature for 15 min, blood samples were centrifuged at 3000 xg for 15 min. Sera were separated, and store in -40 °C to determine testosterone, FSH and LH levels. Determination of testosterone, FSH and LH concentrations in serum: For the quantitative determination of total testosterone, FSH and LH concentrations in serum of pregnant women, by Minividus.

3. Results and Discussion. The present study showed variations in the levels of hormones (testosterone, FSH and LH) in pregnant women with seropositive IgG and controls are presented. The result showed slightly high levels of testosterone (0.40 ng/ml) was detected in patients with toxoplasmosis compared to controls (0.35 ng/ml) but with no statically significant difference (p= 0.80). FSH serum level was lower (1.58 mIU/ml) in chronic toxoplasmosis patients when compared with controls (2.11 mIU/ml), but did not show significant variation (p= 0.48). While the LH level was slightly high (1.50 mIU/ml) in IgG...
positive pregnant women in comparison to IgG negative women (1.69 mIU/ml), but also without significant difference (p=0.005) Regarding the age of patients and controls, comparison of testosterone levels showed slightly elevation in the 1st (15-25 year) and the 2nd [26-34 year] age groups (0.5 ng/ml and 0.33 ng/ml respectively) and slightly decrease in the 3rd (35-40 year) age group (0.64 ng/ml) in chronic toxoplasmosis patients as compared to controls (0.40 ng/ml, 0.35 ng/ml, and 0.70 ng/ml respectively), but without any statically significant differences between patients and controls of the three age groups (p= 0.66, p= 0.69 and p= 0.65 respectively).

The results showed slightly concentration of testosterone in pregnant women with positive IgG antibody (patients) in compared to pregnant women (controls) explain the changed behavior induced by T. gondii as a side effect to suppressed host immunity and thus enhance the chances of organisms surviving in the host (16).

The results of study revealed lower FSH concentration in pregnant women with toxoplasmosis compared to sero-negative pregnant women with statically insignificant difference. The significant lower level of FSH and LH in the age group of 15-24 year may explained by cytokines released peripherally in response to parasite reached the hypothalamus and initiate a sequence of events that inhibit the pulsatile release of gonadotropic releasing hormone, leading to subsequent impairment of the pituitary-ovarian axis. In general, variations in the results among different studies may be due to differences in sample size, age range, environmental factors, parasite strain and technical procedure of hormone test.

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X_2^{(cal)}=0.423 \quad \text{d.f.}=2 \quad X_2^{(tab)}=4.605
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Table.1 Distribution of positive samples for toxoplasmosis according to trimester by

| Trimesters of pregnancy | Total N0. | Seropositive samples |
|------------------------|----------|----------------------|
|                        |          | IgM | %      | IgG | %      | Both | %      |
| First trimester        | 46       | 9   | 19.56 | 14  | 30.43 | 6    | 26.08  |
| Second trimester       | 66       | 10  | 15.15 | 26  | 39.39 | 5    | 13.88  |
| Third trimester        | 13       | 3   | 23.07 | 3   | 23.07 | 3    | 50.0   |
| Total                  | 125      | 22  | 17.6  | 43  | 34.4  | 14   | 21.53  |

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4. Conclusion. The result of current study showed that non-significant changes of testosterone, FSH and LH levels in pregnant women with chronic toxoplasmosis. It is suggested to further investigation of direct correlation between latent toxoplasmosis and psychological disorders in human models soon.

5. References

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