

Study of IL-33 During Pregnancy Period in Women Infected With T.Gondii and Healthy Pregnant Women

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Abstract. Introduction, Toxoplasmosis disease is a parasitic infection that affects women, especially during pregnancy, due to low immunity, so women are vulnerable to infection, including infection with this parasite. The brain and the immune system are the two major adaptive systems in the body, and one regulates the other. There are indications that immune factors may be involved in the pathogenesis of neurodevelopmental disorders. Material and method A total of 90 samples were collected from women infected with toxoplasmosis during pregnancy and divided into two groups according to the questionnaire that was distributed to them. Results The results showed that there was an increase in the level of cytokine (interleukin 33) in pregnant women with toxoplasmosis as compared with the control group. Conclusion and recommendation The rise in the level of this cytokine may be due to its being an immune factor that mediates the inflammatory process that may occur as a result of infection with this parasite

Highlights:

1. Toxoplasmosis affects pregnant women due to weakened immunity.
2. Increased interleukin-33 levels observed in infected pregnant women.
3. Elevated cytokines mediate inflammation linked to toxoplasmosis infection.

Keywords: Toxoplasmosis, Pregnancy, Cytokines, Interleukin-33, Immune Response

Introduction

Toxoplasmosis

is disease caused by the protozoa *Toxoplasma gondii*, a worldwide parasite of human and animals (cats and birds), and infect 30-60% of human population of world wide.

T. gondii can be transmitted via placental leading to fetal death, and might be lead to abortion and prematurity and still birth (Al- Awady et al., 2000). There are 3 Stages of *T. gondii*: (Oocysts) which produce Tachyzoite (trophozoite) which is the active proliferating form and (Cystozoite) or bradyzoite which is the resting form (Sciammarella, 2002). All mammals are intermediate hosts, and Felidae consider as middle (asexual life cycle) and definitive hosts (sexual life cycle). (Sevgili et al., 2005) Man become infected

by eating raw meat contain parasite like sheep, goats and cattle, or by digest of oocysts via utilize of contaminated food or water. Figure (1) summarized life cycle of *T. gondii*

In Iraq, there is a high prevalence of toxoplasmosis, according to (Hamza;2006). (Niazi et al.,1988) found high rate of *Toxoplasma* antibodies in Baghdad women was 39%; In the city of Basra, the results showed that the prevalence of toxoplasmosis ranged from 41.1-52.1% (Jacob et al., 2006). As for research in this regard in the northern region, specifically in the city of Dohuk, Razak et al., 2005 found that the rate of *Toxoplasma* infection was lower by about 0.97%. While Karim, 2007 showed that the prevalence of the disease was 32.6% among the women of the city of Sulaymaniyah in northern Iraq. At the level of the city of Karbala, the infection rates of toxoplasmosis among married couples in the center specialized in immunodeficiency and by using the ELISA IgG antibody technique were 25.6% of the total number of visitors to that center, divided as follows (18.4% and 32.9%) for females and males, respectively (Hassan, 2011).

Sahib et al., 2017 concluded in their research that toxoplasmosis is considered a serious disease in the city of Basra. The method of detecting toxoplasmosis is very important in determining the rates of prevalence of this disease, as it has been shown that the incidence of toxoplasmosis has increased by using different techniques in real time and polymerase chain reaction (Darweesh et al., 2018).

Methods

The study included 60 pregnant women infected with *toxoplasma* their ages between (18-35) years, that attended the Department of Obstetrics and Gynecology in Al-Jumhuri Hospital in Hilla, suffering from depression according to bek scale In addition 30 matched apparently healthy volunteers pregnant women with no history of toxoplasmosis were selected as a control group.

Five milliliters of venous blood were withdrawn from each patient by vein-puncture under aseptic technique by disposable syringe, likewise from control individuals. The blood sample was dispensed in a sterile plain tubes and left for about 1/2 hours to clot and then centrifuged at 1000 r.p.m for 5 minutes at room temperature to separate the serum and dispensed into sterile tightly closed eppendorf tubes and stored at -20°C until assayed.

Result and Discussion

Table (1) show level of IL-33 in pregnant women infected with toxoplasmosis and healthy pregnant women

Group	No.	Mean ± SD
		IL-33 pg/ml
Patients	60	143.78 ± 32.18
Control	30	72.27 ± 11.29
T-test	---	29.323 *

* (P<0.05).

Regarding the levels of interleukin-33 in sera of patients women, they revealed risen concentrations (143.78 ± 32.18 pg/ml), in comparison to the level recorded in women with healthy pregnancies (72.27 ± 11.29 pg/ml), a significant difference (P<0.05), were recorded in table (1)

There are no clear studies on the relationship of toxoplasmosis with immunity and depression, but the currently available studies indicate the relationship of interleukin-33 with toxoplasmosis or with depression separately. Some studies indicated that IL-33 appears in cases of the body's defense against infection, or it may be pro-inflammatory or anti-inflammatory, depending on the disease.

Also, Al-Shamaa¹indicated in one of his researches to the fact that this cytokine has a higher concentration in women with toxoplasmosis compared to healthy women, and this may indicate the role that this cytokine plays in defending the body. (Al-Shamaa, 2014)

Some studies have linked the inflammatory response to depression, as follows: There is a study that showed the association of high concentrations of cerebrospinal fluid cytokines with depression in the neonatal period. These cerebrospinal fluid cytokines were not closely related to plasma cytokines. Central neuroinflammation, in contrast to peripheral inflammation, may represent a mechanistic pathway contributing to perinatal depression.

Some research has shown that people who suffer from depression show an increase in inflammatory symptoms in the body, and among those symptoms is an increase in inflammatory substances such as inflammatory cytokines, as well as pro-inflammatory cytokines in the blood. (miller et al 2015) they also explained that the two types of immunity in the body, acquired and innate, and their interaction with neurotransmitters lead to cases of depression.

Conclusion

The higher elevation of cytokine in the patients group may be attributed to the body's immune defense against the parasite, which creates an inflammatory state

Recommendation

This aspect and more research should be given attention, especially for aborted women, because the abortion process and related psychological conditions may affect the occurrence of new pregnancies again

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Indonesian Journal on Health Science and Medicine

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<https://doi.org/10.21070/ijhsm.v1i2.35>

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