

# Immunological Study in Pregnant Women Infect With Toxoplasma Gondii

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## Abstract:

Toxoplasmosis is an endemic infectious disease, very widely distributed in all parts of the world and called a disease of the five continents and depending on the geographical location since 15% to 85% of the human population asymptotically infected. The present study was carried out on total number one hundred and thirty three women suspected of having toxoplasmosis with and without abortion. The titers of serum immunoglobulin M and G (IgM and IgG) of anti-Toxoplasma antibodies were detected by enzyme linked immunosorbent assay (ELISA) according to the final diagnosis of toxoplasmosis. It was found that women with toxoplasmosis had higher levels of median values of IgM and IgG Abs of T.gondii that were  $0.420 \pm 0.035$  and  $5.461 \pm 0.39$  respectively, while women that did not have toxoplasmosis, had 0.381 and 0.8 respectively. Serum levels of IL-18 and IL-5 detected by ELISA were  $87.01 \pm 10.02$  pg/ml and  $805.70 \pm 122.30$  pg/ml respectively in women with toxoplasmosis, while in women that did not have toxoplasmosis the levels were  $67.59 \pm 10.21$  pg/ml and  $126.62 \pm 35.96$  pg/ml respectively.

## Introduction :

Toxoplasmosis is a zoonotic disease of animals caused by the protozoan parasite *Toxoplasma gondii*, human and other warm blooded animals are its hosts [1].

The infection has a world wide distribution. Approximately one-third of all humanity has been exposed to this parasite,

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Toxoplasmosis has a wide range of prevalence and this variability is related to various factors such as, age, sociocultural and nutritional habits, contact with domestic cats, climatic and geographical conditions [2]. The name Toxoplasma (toxos = arc, plasma = form) is derived from crescent shape. T.gondii was first discovered by Nicolle and Manceaux in 1908 in small North African rodent *Ctenodactylus gundii*. At about the same time Splendore (1908) independently described Toxoplasma in a laboratory rabbit in Sao Paulo, Brazil [3]. Then Toxoplasma gondii was described by (Nicolle and Manceaux) in 1909 as an intestinal coccidium of felids with a usually wide range of intermediate hosts , infection by this parasite is prevalent in many warm –blooded animals including humans [4].

During the first few weeks post-exposure, the infection typically causes a mild flu-like illness or no illness. Thereafter, the parasite rarely causes any symptoms in otherwise healthy adults. However, those with a weakened immune system, such as pregnant women, may become seriously ill, and it can occasionally be fatal. The parasite can cause encephalitis (inflammation of the brain) and neurologic diseases, and can affect the heart, liver, inner ears, and eyes (chorioretinitis) .

In addition patients with congenital infection, since 5- 24% of children becoming ill and dying during neonatal period [5]. Primary acquired infection during pregnancy may cause miscarriage, permanent neurological damage, premature birth and visual impairment [6]. It is well established that T.gondii infection induce strong cell-mediated immune response type-1- cytokines such as gamma interferon (IFN- $\gamma$ ), interleukin-12 (IL-12) and tumor necrosis factor- alpha(TNF- $\alpha$ ) are crucial in protective immunity, while the type-2- cytokines IL-5 is homodimeric glycoprotein produced predominantly by activated cell surface molecules (CD-4) T-cells [7]. since IL-5 enhances B-cell - IL-12 receptor expression and promotes B- cell proliferation and differentiation . Also, IL-5 have protective role against T.gondii and may play role in the production of IL- 12 . IL-5 has also essential role for production and function of eosinophils and serves as an anti apoptotic factor for the latter cells [8].

## **Materials and Methods:**

Samples Collection has been from 197 women doubtful toxoplasmosis collected in Baghdad city from Ibn-AL- Balady hospital and Fatima- AL- Zahraa hospital during the period from October 2013 to February 2014.

**Group I: Patients** The study included 70 women tests proved they are infected toxoplasmosis and women aged between 18-45 years have been diagnosed with infection through laboratory testing , which included screening for antibodies specific IgG, IgM technique using Enzyme Linked Immunosorbent Assay

**Group II: control ( healthy ) Group:** which were collected 20 blood samples Other women in the age group 18-45 years has been making sure not to infect with toxoplasmosis . Sample of venous blood was collected from these women for serum collection.

This study was carried out to asses the presence of Anti-Toxoplasma gondii IgG and IgM. ELISA was use for detection of the antibodies in serum samples using commercial kits, (Bio Kit, Spain). ELISA was performed by the use of two kits (Omega Diagnostica company, Scotland). Human IL- 5 kit by ELISA Cusabio (china) and Human IL- 18 kit by ELISA Cusabio (china).

## **Results & Discussion**

### **Serum levels of IgG in patients women with Toxoplasmosis infections**

IgG levels were assayed by ELISA method in the sera of the patients women with toxoplasmosis infections and compared to the healthy control group. Result showed a statistically significant elevation in the concentration of the IgG in the sera of infected patients women in comparison to those of healthy control group. The concentrations of IgG were significantly elevated ( $P < 0.05$ ) the levels were (mean  $\pm$  SD )  $5.461 \pm 0.39$  IU /ml in comparison to healthy control group  $0.159 \pm 0.018$  IU /ml.

**Serum levels of IgM in patients women with Toxoplasmosis infections** IgM levels were assayed by ELISA method in the sera of the patients women with toxoplasmosis infections and compared to the healthy control group. Result showed a statistically significant elevation in the concentration of the IgM in the sera of infected patients women in comparison to those of healthy control group. The

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concentrations of IgM were significantly elevated ( $P < 0.05$ ) the levels were (mean  $\pm$  SD)  $0.420 \pm 0.035$ ./ml in comparison to healthy control group  $0.161 \pm 0.019$  .

**Table 1. Compare between patients and control in IgG and IgM**

Group	No.	Mean $\pm$ SE	
		IgG	IgM
Patients	70	$5.461 \pm 0.39$	$0.420 \pm 0.035$
Control	20	$0.159 \pm 0.018$	$0.161 \pm 0.019$
LSD Value	---	1.463 *	0.134 *

\* ( $P < 0.05$ ).

The present results indicated that there was an increase in the titer of IgG and IgM antibody in the sera of infected women in comparison with the titer of these antibodies in control sera, that mean there is a defined role of IgG and IgM during the infection with *T. gondii* which is insured by [9]. who was revealed that the immunoglobulins belonging to class IgG, IgM, IgA and IgE is produced in response to infection. This finding is also similar with the results of [10]. in indicating the association between the infection and strong humoral response involving IgM, IgG, IgA and IgE.[11] noted that B-cells are required for vaccination – induced resistance to virulent tachyzoites. In addition to these finding, the presence of high level of IgG indicate that the person has had toxoplasmosis at some time in their life because IgG can persist for many decades and is, therefore, not an indicator of recent infection [12] . Also raised IgM may indicate a current or recent infection because this immunoglobulin typically persist for(6- 9) months after infection and is helpful in diagnosing acute infection [13].

### **effect of infection toxoplasmosis in the level of IL-18, IL-5**

The results suggest that reached from measuring the concentration of IL-5 in a manner ELISA for a living ( 70 ill ) to rise and clear in the rate of concentration of this interleukin this group ( $\pm 31.62 \pm 6.00$  pg / ml) compared to what it is in the control group ( $2.24 \pm 11.31$  pg / ml that number (20) to record this increase, a significant difference ( $P < 0.05$ ) as shown in the table (2) , in line with the findings of the[14] and[15] as well as the findings of the [16]and[17] that the incidence of toxoplasmosis result in an increase in the level of

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IL-5. Produces IL-5 Th2 cells and plays an important role in the immune response , where he works on the differentiation cells acidic Eosinophil addition to increasing the effectiveness of toxicity Cytotoxic activity in cooperation with TNF- $\alpha$ , as well as works on the differentiation and growth of lymphoid cells type B [17]. and the activation of gene expression antibody IgA [18]. which serves to protect the mucosal surfaces Muocosal Sarface sites that are entering the parasite [19]. I have said [20] that the IL-5 urges to increase the production of IL-12, where he is the last to stimulate natural killer cells NK cells to produce kinetic cellular IFN- $\gamma$  , which works with TNF- $\alpha$  to induce gene expression for the production of Nitric Oxide (NO) , which works to kill the parasite inside the cell [21]. As shown in the table ( 2 ) the results that have been reached in the measurement of the concentration of IL-18 ELISA way for a positive Jdot which refers to a rise in the concentration of interleukin- rate for this group (pg / ml 129.43 26.70  $\pm$ ) compared to what it is in the control group ( 72.80 pg / ml  $\pm$  7.02) , but this increase did not occur significant changes (P <0.05), and this is consistent with Matousel him [22]. , which emphasized the role of IL-18 during phases of acute and chronic disease , where Ihvzhma interleukin to produce IFN-  $\gamma$  , which urges the production (NO) is capable of killing the parasite inside a cell.

Table2.Compare between patients and control in IL-18 and IL-5.

Group	No.	Mean $\pm$ SE	
		IL-18	IL-5
Patients	70	87.01 $\pm$ 10.02	805.70 $\pm$ 122.30
Control	20	67.59 $\pm$ 10.21	126.62 $\pm$ 35.96
LSD Value	---	38.921 NS	458.11 *

\* (P<0.05), NS: Non-significant.

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## دراسة مناعية للنساء الحوامل المصابات بداء المقوسات

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### المستخلص

داء المقوسات (داء القطط) مرض معدي مستوطن وواسع الانتشار في كل أنحاء العالم يدعى ((مرض القارات الخمس)) ويتسبب عن الاصابة بطفيلي التوكسوبلازما كوندبي T.gondii، ويعتمد انتشاره على الموقع الجغرافي حيث ان هناك 15%-85% من المجتمع البشري مصابون بالمرض وبدون أعراض.

جريت الدراسة الحالية على 133 مريضة مشكوك باصابتهم بداء القطط لديهن واللاتي يعانين من حالات الاجهاض او بدونه. معيارية الاضداد نوع M و G لطفيلي التوكسوبلازما تم التحري عنها في المصل بطريقة الامتصاص المناعي المرتبط الانزيمي ال ELISA ، حيث وجد ان النساء المصابات بداء المقوسات لديهن أعلى قيم متوسطة من الاضداد M و G والتي بلغت  $0.420 \pm 0.035$  و  $5.461 \pm 0.39$  على التوالي

اما النساء غير المصابات والتي بلغت قيمتها  $0.161 \pm 0.019$  و  $0.159 \pm 0.018$  على التوالي. مستويات الانترليوكينات (IL-5 و IL-18) والتي تم التحري عنها بطريقة الامتصاص المناعي المرتبط الانزيمي ال ELISA في مصل النساء المصابات بداء المقوسات وكانت  $87.01 \pm 10.02$  و  $805.70 \pm 122.30$  على التوالي.بينما كانت في النساء غير المصابات بداء المقوسات  $126.62 \pm 35.96$  و  $67.59 \pm 10.21$  على التوالي.