DETECTION OF IL-6 LEVEL AND THE DIAGNOSTIC VALUE OF ANTI-TOXOPLASMA GONDII IgM and IgG IN ABORTED WOMEN IN AL-NASIRIYA CITY/IRAQ

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ABSTRACT

Toxoplasmosis is an important health care problem through the world caused by an intra – cellular parasite *Toxoplasma gondii* that infect a variety of hosts. In human, the parasite responsible for many illness such as abortion, stillbirth and congenital anomalies. IL-6 is an important cytokine in immune response and it play important role in antibody production and increase cytotoxicity of NK and cytotoxic T—cells. The aim of the current study is determination of the prevalence of anti-*T.gondii* IgM and IgG in aborted women and the role of IL-6 during infection. A total of (414) aborted women included in this study and (30) apparently healthy women as control group, the serum was tested By chemoluminescent and ELISA to detects anti-*T.gondii* antibody and for determination of IL-6 levels. The results shows that the anti-*T.gondii* IgM was not detected in the serum of women under study. While, anti-*T.gondii* IgG was detected in 89 (27.38 %) of aborted women with high significant differences under (P<0.001) and the mean of IL-6 level was high (19.83 pg/ml) in aborted women in compared with control group (5.25 pg/ml) with high significant differences (P< 0.001). In brief, the prevalence of toxoplasmosis was high among aborted women by detection of specific IgG antibody which have a high diagnostic value in compared with specific IgM antibody, IL-6 play an important role during the course of infection by *T. gondii* in aborted women.

KEYWORDS: Toxoplasmosis, cytokine, serological diagnosis.
INTRODUCTION

*Toxoplasma gondii* is an obligate intracellular parasite has an important medical and veterinary problem, the pathogen can infects a variety of host vertebrate ,infections are a world wide spread parasitic infections which infect any individual at different ages. During pregnancy, primary infection may lead to transmission of parasite to the fetus and the severe consequences for the fetus can occur, such as retino-choroiditis, hydrocephalus and intracranial calcification.[1,2] *Toxoplasma gondii*, a common protozoan parasite responsible for both severe congenital birth defects and fatal encephalitis in immunocompromised people may cause abortion and severe mental retardation. Retinal and neurological damage may arise when the infections occur in late pregnancy.[3]

This parasite can survive in all nucleated cells, including blood cells in acute stage, forms a specific vacuole that protect the parasite from host cell immune system. In the chronic stage, the parasite can form a cyst in the central nervous system, skeletal muscle and eye tissue and can exist for the lifetime of its host. The cysts can rupture and release highly invasive tachyzoite, which may cause a recurrent infection and potentially fatal if the host is in a state of immune deficiency.[4,5]

The immunity against *Toxoplasma gondii* is very complex because of this parasite can infects different body tissues each of these tissues has a specific defense mechanism. Also, the toxoplasma has a variety of antigens and multiple stages of growth cycles that have a distinct antigens for each one, all of these reasons lead to difficulty in the study of immune response against toxoplasma.[6]

The immune system has a crucial role in both the course of the infection and in the evolution of toxoplasmosis disease. In particular, IFN-gamma plays an important role in resistance to toxoplasmosis. The researchers shown that any mutation or polymorphism occur in the genes that responsible for production of these cytokines may increase susceptibility to toxoplasmosis and severity of disease[7], in order to induce maternal tolerance during pregnancy the Th1 response is down-regulated due to the action of Th2 cytokines e.g. IL-4. But, this type of immune response play important role in defense and control of *T. gondii* infection and may lead to severe complications in pregnancy.[8,9]

IL-6 is one of the major physiologic mediators of acute phase reaction by induces production of acute-phase proteins by hepatocytes. It is a pleiotropic cytokine influencing antigen-
specific immune responses, inflammatory reactions, hematopoiesis, bone metabolism, and neural development.\textsuperscript{[10,11]} IL-6 play a Critical roles during infection with \textit{T. gondii}. Thus, IL-6 is required for the development of protective immunity to this pathogen, the previous studies shown that mice deficient in IL-6 develop high cyst burdens and capitulate to a severe encephalitis associated with a failure to control parasite replication and an increasing in mortality in IL-6 deficient mice may be associated to increased parasite burden and the excessive inflammatory response characterized by IFN-gamma and IgG2a levels.\textsuperscript{[12,13]} The aim of this study is determination of frequency of anti-\textit{T. gondii} IgG & IgM among the aborted women and the role of IL-6 during infection with \textit{T. gondii} in these patients.

**METHODOLOGY**

**Specimens collection:** The blood Specimens were collected from (414) aborted women administrated to bint Al-Huda teaching hospital–Thi-Qar province during the period from August / 2014 to January / 2015. While, the control group including (30) apparently healthy women with no history of abortion.

**Antibody detection:** The anti-toxoplasma IgG & IgM Ab. was detected by chemoluminescent technique using (Cobas e411-Germany). The kit provided by (Roche diagnostic-Germany) and the test accomplished according to the manufacturer.

**IL-6 determination:** The test was performed by using ELISA technique, the kit provided by (Rayebio-USA) according to the index that supplied by manufacturer.

**RESULTS**

The frequency of Anti-\textit{T. gondii} IgG among aborted women in this study was 89 cases represents 27.38% of total patients with the mean age 28.7±7.637 Std. While, negative group has a mean age 25.93±6.816 Std. with highly significant differences under P<0.001 as shown in table (1). Anti-\textit{T. gondii} IgM not detected in the sera of all aborted women under study.

**Table (1): The relationship between age and frequency of anti-\textit{T. gondii} IgG among aborted women.**

<table>
<thead>
<tr>
<th>Anti-\textit{T. gondii} IgG</th>
<th>No.</th>
<th>%</th>
<th>Mean age</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>89</td>
<td>27.38%</td>
<td>28.70</td>
<td>7.637</td>
</tr>
<tr>
<td>Negative</td>
<td>325</td>
<td>72.62%</td>
<td>25.93</td>
<td>6.816</td>
</tr>
</tbody>
</table>
Table (2) shown the levels of IL-6, in aborted women, the mean of IL-6 level was 19.83 pg/ml. But, in control group was 5.25 pg/ml with highly significant differences under P<0.001.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>5.25</td>
<td>2.10</td>
<td>9.50</td>
<td>0.23</td>
</tr>
<tr>
<td>Patients</td>
<td>19.83</td>
<td>3.60</td>
<td>43.06</td>
<td>1.29</td>
</tr>
</tbody>
</table>

**DISCUSSION**

*T. gondii* is an obligate intracellular parasite that is cause an opportunistic infection in pregnant women, elderly patients and immunocompromised individuals. This infection represent an important health care problem around the world because this parasite is highly prevalent in all communities and infect a wide range of hosts. The disease have a health concern because it lead to abortions and neonatal complications in humans. Toxoplasmosis is the most common infections associated with unfavorable outcome of pregnancy.[14,15]

In this study the frequency of toxoplasmosis was high which is comparable to the mean of prevalence rate of toxoplasmosis in human population is (25-30) %. But this rate differ greatly among human populations and areas and ranging from (10-80) % this differences may related to the differences in climate, where a high prevalence rate shown in warm and humid areas which associated with factors that help in survival of parasite oocystes. Also, the differences in the percent of infections may be associated to economic state, health care programs, types of foods and undercooked foods, where the high consuming rate of red meat and poultry as seen in Iraqi populations is related to increase the prevalence of infections.[16,17,18]

Seroprevalence of toxoplasmosis occur early in life especially in poor communities when compared with high socioeconomic populations where the incidence of infections is delay and the sero-positivity of cases of toxoplasma increased with age as shown in this study.[18,19]

Serological tests remain the most useful technique in determination of toxoplasma infections by detection of Anti-*T. gondii* IgG & IgM in patients sera. In acute infection IgM and IgG increased within one to two weeks of infection. An increase in the IgM level indicate current infection. While, IgG is an indicator for chronic state, most studies shows high sero-positivity for IgG which establish that the patient suffering from *Toxoplasma gondii* infection, the results of current study and previous studies indicate that IgG has a great diagnostic value.
when compared with IgM and the most patients under study undergo a chronic toxoplasma infection.\textsuperscript{[18,19]}

During normal pregnancy, the immune response characterized by low Level of cell mediated immune response (Th1) and high level of humoral response (Th2), the role of immune system in abortion not well be recognized. Although, some studies indicated that the Th1 response play an important role in several aborted cases.\textsuperscript{[20,21]}

Interleukine-6 is an important cytokine produced by a variety of cells such as macrophage, endothelial cells and Th2, this cytokine responsible for the production of acute phase protein, increase cytotoxicity of NK cells and cytotoxic T lymphocytes and it enhance differentiation of B cells to plasma cells and increase antibody production. In the current study, the serum level of IL-6 was higher than its level in control group which considered as an indicator for acute inflammation during infection and the results was comparable to the previous studies that shown high level of IL-6 in patients with toxoplasmosis and in cell culture supernatant, This high level may illustrate the presence of anti- \textit{T. gondii} IgG antibody in the serum of aborted women in detection level in this study through the action of IL-6 on B cells. But, this may be occur early in infection before the immunological shift from Th2 into Th1 that may responsible for the several cases of abortion.\textsuperscript{[21,22,23]}

**CONCLUSION**

In this study, the prevalence of toxoplasmosis was increase with age and it high among aborted women by detection of specific IgG antibody which have a high diagnostic value in compared with specific IgM antibody, IL-6 level increase and play an important role during the course of infection by \textit{T. gondii} in aborted women.

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