Prevalence of IgM and IgG Antibodies Specific of *Toxoplasma gondii* in aborted Women in some Cities in Iraqi Kurdistan Region

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Abstract

The current study was carried out to determine seroprevalence of *Toxoplasma gondii* infection among 418 women subjected to abortion aged from 16 to 45 years in four different areas in Iraqi Kurdistan region. Two different serological tests were used for diagnosis, ELISA with directed form and mini VIDAS. The results show that each of IgM and IgG antibodies were identified as positive in 37 (8.85%) samples. Results also shown that the ratio of the positive IgM antibodies to *T. gondii* were 4.18% for Duhok aborted women, 20.29% for Ranya aborted women, 29.03% for Koya aborted women and 14.29% for Qaladza aborted women. The ratio of the positive IgG antibodies were 10.29, 5.85, 0 and 14.29% for Duhok, Ranya, Koya and Qaladza aborted women, respectively. There were significant differences between positive and negative antibodies value in respect to IgM and IgG in blood sera for Duhok, Ranya and Koya cities.

Key words: Toxoplasmosis, abortion, IgM, IgG

Introduction

Toxoplasmosis is a zoonotic disease caused by the protozoan parasite *Toxoplasma gondii*. This parasite has a worldwide distribution and is capable of infecting all worm-blooded animals (Buxton, 1997). The parasite is transmitted to humans by ingestion of cysts in raw or undercooked meat, drinking water or eating vegetables contaminated with cat feces (Tenter, et al. 2000, Cosoroabă, 2005 and Moselio, 2009). Most patients who become infected with *Toxoplasma gondii* and develop toxoplasmosis do not know it and passed unremarkable (Dubey. 2008 and AL-Ani, 2012), the positivity of toxoplasmosis serology is increased with increasing the age (Duthon, 1997).

The primary infection during pregnancy is generally asymptomatic, or it can be characterized with mild fever, malaise, sore throat, headache, maculopapular rash and lymphadenopathy (Montaya and Liesenfeld, 2004). Infection with *Toxoplasma gondii* during pregnancy can lead to infect the fetus in nearly 30% of cases. (Ajzenberg et al. 2002). This protozoa has an indirect life cycle, with cats and other Felids as definitive hosts of *T. gondii* (Sedlak and Bartova 2006).

Toxoplasmosis is a multi-systemic disease; however a latent form of the disease usually develops (Dubey and Beattie, 1988; Dubey, 2003). In France a study conducted in Nantes city between 2000-2001 on 3089 delivery women for surveying the serology of toxoplasmosis, 1275 (58.70%) were negative and 1814 were seropositive (Padiue, 2003). In Iraq, the antibodies to *T. gondii* were found in women from most citeis of Iraq for example Wasit city and Falluja city and around area in the middle of Iraq (Rahi and Jasim, 2011), from (Husain, et al. 2011), in the North region of Iraq, antibodies to *T. gondii* were found in Kirkuk city (Kadir et al., 1992), Northern governorate in Iraq (Niazi et al., 1992), also in the South of Iraq in Basrah governorate (Shani, 2004).

In a study conducted by Rahi and Jasim (2011) 49 blood samples were collected from women with recurrent abortion at Iraqi Kut city. Serums were tested for anti-Toxoplasma IgM antibodies by using dipstick dye immunoassay method. Seropositive cases were 24 (49%) and 25 (51%) serum samples were seronegative for anti-Toxoplasma IgM antibody, and there was relationship between the prevalence of disease and history of contact with cats (83%). While Husain et al. (2011) determine seroprevalence of *Toxoplasma gondii* infection among women subjected to abortion or threatened abortion aged 25 to 35 years, when by direct
agglutination method and ELISA technique methods. There results show that the total infection rate was 18.88% by agglutination test and 13.33% by ELISA tech.

The aim of this work is to estimate the infection by *Toxoplasma* among recently aborted women if they are not infected or if they are infected and the infection is recent or it is an ancient infection by detecting each of IgM and IgG of *Toxoplasma* in blood serum.

**Material and Methods**

In this study, a total of 418 serum blood samples of aborted women were submitted for serodiagnosis of toxoplasmosis, from four different cities of the Iraqi Kurdistan region. Serum samples examined for the presence of *T. gondii* antibodies included 311 sample from a private laboratory in Duhok city, 69 samples from two laboratories in Ranya city, 31 samples from a privat laboratory in Koya city and 7 samples from a privat laboratory in Qladza city.

Serum samples were tested during approximately 12 months from April 2014 to April 2015 for each of Ranya, Koya and Qladza cities, while it was from April 2012 to April 2015 for Duhok city.

Two different methods were used for identifying toxoplasmosis in the patients for this study: ELISA with directed form and mini VIDAS, these two common tests have different procedure and different normal values.

**Statistical analysis**

The statistical analysis of *T. gondii* prevalence between IgM and IgG antibodies in the different regions was performed by chi-square test, using SPSS 18 statistical program. The differences were considered statistically significant when P ≤ 0.05 (Reza, 2006).

**Results and Discussions**

In the present study the ELISA with directed form and mini VIDAS were applied for the detection of IgM and IgG antibodies of toxoplasmosis in aborted women in four different cities in Iraqi Kurdistan region. Toxoplasmosis is an important and dangerous parasitic disease in pregnant woman which cause abortion and congenital malformation especially in 1st semester of gravidity. In our study, 418 aborted women who were between 16 to 45 years of age were included in the study. IgM and IgG antibodies were identified as negative (seronegative) in 314 (82.30%). An IgM antibody was identified as positive and IgG antibodies was identify as negative in 37 (8.85%) samples. An IgM antibody was identified as negative and IgG antibodies was identify as positive in 37 (8.85%) samples too. Whereas IgM and IgG antibodies as positive in the same sample were not identify. Anti-toxoplasma antibodies identified according to location sampling are given in Table 1.

Rana (2002) showed that the ratio of anti-Toxoplasma IgM was 60 (43.7%) pregnant women in Najaf province, and Masoodi et al. (2000) recorded that, 53.14% of women who were with recurrent abortion were positive. At Ahwaz southern of Iran from relationship between *Toxoplasma gondii* and abortion they achieve that out of 130 women with abortion, 32 (24.6%) and, out of 130 women with normal delivery, 28 (21.5%) were positive for IgG antibody against *T. gondii*. However, statistical analysis indicated no significant differences. In addition, IgM antibody was detected in one woman who had aborted but not in women with normal childbirth.

Results in Table 2 shows that the positive IgM antibodies to *T. gondii* (indicator of new infection by *T. gondii*). There are 13 of 311 (4.18%) Duhok aborted women, 14 of 69 (20.29%) Ranya aborted women, 9 of 31 (29.03%) Koya aborted women and 1 of 7 (14.29%) Qaladza aborted women respectively. Positive IgG (indicator of older infection by *T. gondii*) antibodies were found in 32 of 311 (10.29%) Duhok aborted women, 4 of 69 (5.85%) Ranya aborted women, 0 of 31 (0%) Koya aborted women and 1 of 7 (14.29%) Qaladza aborted women, respectively.
Statistical analysis shown in table 2 appears that there were significant differences between positive and negative values in respect to IgM and IgG antibodies in blood serums for Duhok, Ranya and Koya cities.

The exist of positive IgM and IgG in Kurdistan, may due to many cats live errant and have contact with women and the spread widely of the parasite among others animals. The cause of abortion because of T.gondii is still very few due to the early affecting with the T. gondii during early life and getting immunity. Serodiagnosis of T. gondii is important in pregnant women in the beginning of gestation and every trimester for prophylaxis and treatment against this parasite.

Table 1. Seroprevalence of Toxoplasma antibody in aborted women in different cities in Iraqi Kurdistan region.

<table>
<thead>
<tr>
<th>Location</th>
<th>IgM and IgG antibodies (-)</th>
<th>IgM (+) and IgG (-) antibodies</th>
<th>IgM (-) and IgG (+) antibodies</th>
<th>IgM and IgG antibodies (+)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duhok</td>
<td>266 (85.53)</td>
<td>13 (4.18)</td>
<td>32 (10.29)</td>
<td>0 (0)</td>
<td>311</td>
</tr>
<tr>
<td>Ranya</td>
<td>51 (83.91)</td>
<td>14 (20.29)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>69</td>
</tr>
<tr>
<td>Koya</td>
<td>22 (70.97)</td>
<td>9 (29.03)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>31</td>
</tr>
<tr>
<td>Qaladza</td>
<td>5 (71.43)</td>
<td>1 (14.29)</td>
<td>1 (14.29)</td>
<td>0 (0)</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>344 (82.30%)</td>
<td>37 (8.85%)</td>
<td>37 (8.85%)</td>
<td>0 (0%)</td>
<td>418</td>
</tr>
</tbody>
</table>

Table 2. The prevalence of serum antibodies IgM and IgG to T. gondii in aborted women in different cities in Iraqi Kurdistan region.

<table>
<thead>
<tr>
<th>Location</th>
<th>IgM antibodies</th>
<th>IgG antibodies</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number of positive samples (%)</td>
<td>number of negative samples (%)</td>
<td>number of positive samples (%)</td>
<td>number of negative samples (%)</td>
</tr>
<tr>
<td>Duhok</td>
<td>13 (4.18)</td>
<td>298 (95.82)</td>
<td>32 (10.29)</td>
<td>279 (89.71)</td>
</tr>
<tr>
<td>Ranya</td>
<td>14 (20.29)</td>
<td>55 (79.71)</td>
<td>4 (5.80)</td>
<td>65 (94.20)</td>
</tr>
<tr>
<td>Koya</td>
<td>9 (29.03)</td>
<td>22 (70.97)</td>
<td>0 (0)</td>
<td>31 (100)</td>
</tr>
<tr>
<td>Qaladza</td>
<td>1 (14.29)</td>
<td>6 (85.72)</td>
<td>1 (14.29)</td>
<td>6 (85.71)</td>
</tr>
<tr>
<td>Total</td>
<td>37 (8.85%)</td>
<td>318 (76.08%)</td>
<td>37 (8.85%)</td>
<td>381 (91.15%)</td>
</tr>
</tbody>
</table>

Conclusions

In conclusion, this study revealed non negligible seropostivity 8.85% positive to IgM and to IgG antibodies for toxoplasmosis among 418 females aborted in (Duhok, Ranya, Koya, & Qaladza) cities that they went to laboratories for looking of toxoplasmosis. It is important to examine each woman serologically who decides to be pregnant and during the pregnancy.

These data and results are limited because we took a limited number of laboratories, in order to have more adjusted result in Iraqi Kurdistan region we need to work on the scale of the nation. Also better results may got if trimester pregnancy examine were done on pregnant women, not only for epidemiologic study but to prevent the dramatically effects of this parasite on fetus especially this infection is treatable easily.


