Seroepidemiological study of Toxoplasmosis among pregnant women in Salah – Adden government.

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Abstract

Toxoplasma gondii is worldwide distribution varies from 7% to 52.3% and causes several complications during pregnancy such as abortion especially in first trimester and congenital malformation. The present study is aimed to determine seroprevalence of Toxoplasmosis among pregnant women and to assess the relation of abnormalities and infection with Toxoplasma gondii, we tested 226 pregnant women had single or multiple fetal loss, for several reasons, 66(29.2%) of pregnant women had Toxoplasmosis. All women were examined for presence of Toxoplasma agglutination test and specific IgG and IgM antibodies by enzyme-linked immunofluorescent assay. Antitoxoplasma IgG indicate old or chronic infection was 59(26.1%) of cases while IgM antibody indicate recent or acute infection was 7(3.1%) of cases. Toxoplasmosis still considered one of the risk factors for fetal loss, so that serodiagnosis should be recommended to distinguish acute and chronic infection by determining the level of IgM and IgG antibody not only in pregnant women but even unmarried women as a routine test.

Key words: Toxoplasmosis, abortions.

Introduction

Toxoplasmosis is a parasitic disease caused by the protozoan Toxoplasma gondii which is a coccidium protozoan (1), firstly demonstrated in 1908 in the gondii, an African rodent, by Nicolle and Marceaux. Its name derived from the Greek toxo (arc), is based on characteristic shape of the organism (2). Then in 1909 differentiated the disease from Leishmania and named Toxoplasma gondii (3,4). T. gondii is an obligate intracellular sporozoan. It has sexual and asexual reproductive cycles occur within gastrointestinal tract of definitive host cats, bobcats, ocelots and cougars. The disease transmitted to other host species "human" by ingestion of raw meats and oocysts passed in the feces of the infected felines (5,6), or transmitted from mother to fetus (1,5,6). The life cycle of T. gondii is shown in diagram NO. 1.

T. gondii occurs worldwide and infects more than 500 million people. Fortunately most people don’t know they infected with the parasite (7). Toxoplasmosis symptoms in humans are variable. The majority of patients is completely asymptomatic clinical manifestation, when they appear, vary with the type of the host involved (5,7).

Acute Toxoplasmosis occur when person firstly exposed to parasite during few first weeks of infection causes mild flu like illness, fever, headache, lymphadenopathy, muscle ache, and pain last for month or more. However, in pregnant women may become seriously ill and the consequences to her baby can be grave especially in first and second trimester and causes abortion, still birth (dead fetus in uterus), and congenital abnormalities (1,5,7,8). The first recorded congenital case was in 1923 (4).

Chronic toxoplasmosis is long term infection occurs in everyone infected with T. gondii which is remain encysted in nervous and muscle tissue.
controlled by host immunity, most people have no symptoms (1,9). T. gondii may affect human behavior include its effect on dopamine and on testosterone (10).

Serological procedures have been available for many years, however they are not routinely offered by most clinical laboratories because of high cost, lack of trained personal, low number of test orders and problems with sensitivity and specificity and interpretation slandered techniques that have been used include complement fixation CF, indirect hemagglutination IHA, indirect fluorescent antibody IFA, soluble antigen fluorescent antibody, latex agglutination LA, counter electrophoresis, enzyme-linked immunofluorescence assay ELISA, radioimmunoassay and intradermal tests (9).

Materials and Methods

This study was carried out in Salah Adden government from September 2009 to November 2010. The clinical diagnosis was carried out at obstetric and gynecological clinic. The total number of patients involved in this study was 226 pregnant women, age ranged between (15 – 44 years). These patients were registered and had a structured questionnaire which comprised personal and epidemiological information. Registration include the name, residential address, age, parity and times of abortion.

Five venous blood for serum samples were taken from each patient, the serological tests were done including latex agglutination test (Toxocell Latex, Biokit, Barcelona. The antibody titer was also estimated by using enzyme – linked immunofluorescence technique (Vidas Toxo IgM, bio Merieux, Marcy – l’Etoile, France).

Results

This study was carried out from September 2009 to November 2010. It includes 226 patient with abortion or history of recurrent abortion or still birth (dead fetus in uterus), attending obstetric and gynecological clinic. Out of 226 patient with abortion 66(29.2%) cases have abortion due to Toxoplasmosis, while 160(70.7%) case have abortion due to other causes as in figure (1).

Figure (2) showed the prevalence due to Toxoplasmosis according to the age. The majority of patients were 21(31.8%) case between (20 – 24 ) years.

Figure (3) showed the pregnant women with abortion due to Toxoplasmosis was most common in rural area (62.1%) of cases, while (37. 8%) of the cases in urban area.

The results represent that the highest abortion’s Toxoplasmosis was 38(57.5%) case in first trimester of pregnancy as in figure (4).

Regarding Toxoplasma antibody titer of IgG and IgM in pregnant women with abortion. IgG titer was 59(26.1%) case, while IgM titer was 7(3.1%) case as in table (1).

The Toxoplasma latex agglutination test in aborted women showed high titer at level of 1 : 80 as in figure (5).

Out come of pregnant women with toxoplasmosis in this study represent, the abortion was the mainly complication 56(84.8%) case, still birth (dead fetus in the uterus) was 7(10.6%) case, hydrocephalus 2(3%) case, and neuropathy epilepsy was 1(1.5%) case, as in figure (6).

Discussion

Approximately one third of world’s population is infected by the obligate intracellular protozoan Toxoplasma gondii. In contrary to the immunocompetent individuals, acute infection during pregnancy constitutes a great maternal challenge due to the risk of congenital toxoplasmosis (11,12). Serum testing is still used for
diagnosis of toxoplasmosis, antibodies which are increasingly used, most cases with positive IgG titer is enough to establish that the patient has been infected with Toxoplasma gondii, and indicate chronic infection, while positive IgM indicate recent infection, also negative IgM result may indicate so early that antibody response has not yet developed or is undetectable (13,14).

In this present study 66(29.2%) pregnant women had positive latex agglutination test for Toxoplasma gondii from 1:20 to 1:640 and most of these women referred to the specific antitoxoplasma IgG and IgM antibody test by using the enzyme-linked immunofluorescent assay (ELISA) technique, Toxoplasma prevalence among pregnant women with single or multiple abortion was 26.1% for IgG – Ab, and 3.1% of IgM – Ab, IgM- Ab provides more rapid confirmation of acute infection rise within first week of infection, peak in 2 – 4 week and quickly revert to negative, it also appears that IgM- Abs are produced after reactivation of latent disease.

Al – Doski (15), reported 41.8% cases were positive by lative latex agglutination test in Duhok province, Al – Sim`ni (16), mentioned a seropositivity of 39.33% by latex agglutination test in Mosul. Razzak A.H. (17), in Duhok northern Iraq, tested 310 women with single or multiple fetus10 women with single or multiple fetal loss for evidence of infection only 3(1.0%) cases were positive by ELISA specific IgM – Ab, while 59.4% of pregnant women were positive by Toxoplasma agglutination test with titer from 1:20 to 1:640. Also, Rai et al (18), found 3% of Nepalese pregnant women testing positive had toxoplasma IgM – Ab from 345 case, while Singh (19), studied 2343 pregnant women with single or multiple fetal loss in UAE, he found that only 3 were positive for IgM. Another study in Saudia Arabia (20), found high prevalence of IgG – Ab 25%, but low prevalence 5% of active disease. The prevalence of toxoplasmosis was reported 31.6% by other study in Abha of Saudia Arabia (21), and 35.6% in Makah (22). Al – Harthi el al,(23), 2006, mentioned a seroprevalence 29.4% in Makah.

Also Hamdan Al – Mohammed et al (24), studied 160 early pregnant women in Saudia Arabia, sera were screened for antitoxoplasma IgG – Ab were 44(27.5%) of pregnant women.

In Bahrain, Tabbara and Saleh (25), reported a prevalence of 21.8% for IgG among selected group, while in Turkey (26) were 60.4% for IgG and 3% for IgM. Al – Hindi Adnan and Lubbad A.M (27), found 17.9% of antitoxoplasma IgG – Ab and 12.8% of IgM in Palestinian aborted women in Gaza.

Elena Crucerescu and Diana Lovin (28), in eastern Romania mentioned toxoplasmosis prevalence among pregnant women was 36.77% as chronic infection (IgG – Ab) and 4.23% for IgM as acute acquired or recent infection.

Our results indicated the great risk group of pregnant women with toxoplasmosis at the age between 20 – 24 year was (31.8%) of cases then 25 – 29 year was (18.18%) of cases, these results corresponding with Razzak A.H. et al (17), who mentioned the majority of the participants were in between twenties 20 – 29 year about 64.8% of cases in Duhok, also with Hamdan Al – Mohammad et al (24), in Saudi Arabia reported the age group who more affected with toxoplasmosis between 21 – 30 year was 43% from 86 pregnant women. As well as Al – Hindi Adnan and Lubbad A.M. (27), reported the age group 23 – 28 years old were at great risk of toxoplasmosis infection was 25.5% in Gaza. In addition to that the 41% toxoplasmosis seroprevalence in pregnant women with average age of 26 years in Romania at the same level as France and Austria (28).

The present study showed the pregnant women with toxoplasmosis were most common in rural area (62.1%) of cases, similar to Razzak A.H. et al (17), mentioned residence was (26.5)% of pregnant
women with toxoplasmosis in rural area, as well as study in Saudi Arabia (24).

This is due to the human body in rural area were contact with animals either in house or farms by working and can be contaminated with cat and other animals feces in soil of garden or farms or unwashed fruits and vegetables. Also toxoplasmosis can be transmitted by uncooked or inadequate cooked food or meat in addition to that the cats found in the household or inside the house of farmers than others in urban region, so the

In present study the results indicated the pregnant women with toxoplasmosis more liable for abortion in first trimester (57.5%) of cases, this is similar to the study of Al – Hindi Adnan and Lubbad A.M. (27), reported 35.7% of aborted women with toxoplasmosis occurred in first trimester. Also Elena Crucerescu and Diana (28), showed 4.23% of Toxoplasma serodiagnosis of women suffering from spontaneous abortion in first trimester. In addition to the abortion by toxoplasmosis the other complications of toxoplasmosis but less common including still birth (dead fetus in uterus), hydrocephalus, and neurological abnormalities in current study were 7(10.6%), 2(3%), and 1(1.5%) of cases respectively, similar to Razzak A.H. et al (17), reported tow babies had congenital anomalies and one anencephalic baby from 185 pregnant women with positive toxoplasmosis, while other study mentioned 5.8% of pregnant women with seropositive toxoplasmosis had congenital malformation like hydrocephalus and abnormal, while the still birth recorded 41.7% from 312 pregnant women with abortion (27).

About treatment of toxoplasmosis the normal patients not require therapy unless symptoms are particularly severe or vital organs are involved such as eye. In pregnant women should be treated if acute infection r reactivation is documented.

Serological screening should be taken into consideration largely specifically IgM – Ab to recognized the recent or acute toxoplasmosis. We recommend the gynecologist doctors should take and focus on bad obstetric history especially abortion and do it the latex agglutination test for toxoplasmosis, and if positive ELISA test for determining Ab of IgM and IgG or other investigations should be done as routine tests not only in pregnant women or aborted women but also in unmarried women.
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15* Al-Doski BD. Seroepidemiological study of toxoplasmosis among different groups of population in Duhok city by using latex agglutination test and indirect hemagglutination test [thesis]. Duhok, Iraq, university of Duhok,2000.


22* Ghazi HO. Telmesani AM & Mahomed MF. TORCH agents in pregnant Saudi women.


**Table 1**: Toxoplasmosis serologic status in pregnant women with abortion.

<table>
<thead>
<tr>
<th></th>
<th>NO.</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td>Sero positive</td>
<td>66</td>
<td>29.2%</td>
</tr>
<tr>
<td>Chronic infection IgG - Ab</td>
<td>59</td>
<td>26.1%</td>
</tr>
<tr>
<td>Acute infection IgM - Ab</td>
<td>7</td>
<td>3.1%</td>
</tr>
<tr>
<td>Sero negative</td>
<td>160</td>
<td>70.7%</td>
</tr>
</tbody>
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**Fig: 1** Distribution of pregnant women with abortions
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Fig : 2 Distribution of pregnant women with Toxoplasmosis according to the age

Fig 3: Distribution of pregnant women with Toxoplasmosis according to residence
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Fig: 4 Distribution of pregnant women with Toxoplasmosis based on abortion's time
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Fig: 5 Distribution of rising titer Ab by Latex agglutination (LA) test in pregnant women with Toxoplasmosis.
**Fig: 6 Distribution of Toxoplasmosis complications in presenting study**

- **85% Abortion**
- **11% Still birth**
- **3% Hydrocephaly**
- **1% Neuropathy epilepsy**