Prevalence of *Toxoplasma gondii* and *Cytomegalovirus* in Sera of Aborted Women in Samaraa city

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Abstract

The aim of this study was to detect the relationship between Toxoplasmosis, Cytomegalovirus infections and occurrence of abortion. The records of 173 aborted women between age of less than twenty years and fifty years old attending to the hospital of Samaraa general hospital from October 2015 to April 2016 were reviewed. Investigation by using VIDAS technique represented that *T. Gondii* antibodies showed in 54(31.2 %) of aborted women ,while 23(13.3 %) represented infected with *Cytomegalovirus* and 7(4.1%) were infected with both Toxoplasmosis and Cytomegalovirus. Also the study showed that 77 (44.5%) of aborted women were in aged groups between 21-30 years old ,and the anti-toxoplasmosis IgM &IgG found in 66(38.2%) and anti-cytomegalovirus IgM &IgG found only in 30(17.34%) in aborted women.

Key words: Toxoplasmosis, Cytomegalovirus, Abortion, Samaraa city.

Introduction

One of the most widespread parasites in the world is *Toxoplasma gondii* . It is causing abortion, about 1:3 of the population is risky to this parasite, and it is dangerous for mothers when she infected during pregnancy and infants (1,2). *T. gondii* infects humans and warm-blooded animals and consider intracellular protozoan (1). infected human with the parasites occurring during ingestion food or water contaminated with oocytes bring down by cats, eating raw meat or under cooked meat containing tissue cysts and by blood transfusions or by transplantations (3). In pregnant women the infected with T. gondii can be transmitted to the fetus and cause many disease such as blindness, mental retardation, epilepsy and death (4).

One of the most common congenital viral infection is human cytomegalovirus (HCMV) it is worldwide and 90% of cases probably asymptomatic and the rest cause severe fetal damage and unusuall death due to abortion(5). During pregnancy Cytomegalovirus (CMV) infection is very complex compared with other infections, because the virus can be frequently reactivated during the childbearing age and be inherited to the fetus despite matemal immunity (6). HCMV infection considered as complex original sin due to the ability of virus act as an immune modulator to avoid elimination from the host through working on an array of immune evasion strategies, and the proteins of viral contributed in the regulation of cellular gene expression and inducement of pro-inflammatory cytokine or inducement of autoimmune state(7).

During recent years, many studies indicate that the greed of specific immunoglobulin G (IgG) is appropriate tool for distinguishing between acute and recurrent or past infection with a parasite (8). In the case of *T. gondii* infections the high concentration of IgG serves to rule out a recent infection, while the low concentration results are not signal of a recent or past infection (9). This is due to that in T. gondii infection the maturation of antibody (*T. gondii* IgG) in response to infection generally are slow and are more slowed in treated patients compared to untreated patients (10). Accordingly, low concentration of antibodies can go on for more than one year, and therefore cannot be utilized to diagnose an acute *T. gondii* infection (11).

The most common approach utilized to limitation HCMV infected individuals is by detection of HCMV specific antibodies. Many types of tests are available for the determination of the anti-HCMV antibody titer in serum with different degrees of sensitivity, the ELISA is the most widely procedure used. The detection of HCMV immunoglobulin M (IgM) is a very sensitive marker for primary infection and can be detected for sevral months following primary infection and may also be produced following reactivation. or reinfection.

Usually the positive IgG antibody result is a signal for past exposure to the *T. gondii* and CMV and is not indicative for current active infection. Detection of IgM antibody is more difficult, and false positive and false negative results may occur (12). Therefore, this study was carried out to determine the seroprevalence of *Toxoplasma gondii* and CMV infections among aborted women in Samaraa city in order to avoid many of the abortions in the future.

Materials and Methods

Patients

The study population includes 173 women with a history of gyneco-logical problems attending to Samaraa general hospital in Iraq, during October 2015 to April 2016. The age of the study groups ranged from 20≤ and ≥ 50 years.

Collection of samples and serological tests

From each patient we took 5 ml of blood and put in tube for clotting; Sera were separated and stored in sterile tubes at -20ºC until serological tests. Sera were screened for detection of IgM and IgG antibodies against *Toxoplasma gondii*, and Cytomegalovirus by (VIDAS TOXO IgM and IgG, Biomerieux, France) as recommended by the manufacture company.

Results

In table (1) we observed that the higher rate of aborted women in age group between 21-30 years old (44.6%), followed by 31- 40 years old 24.9% and the lowest rate were in age group more than fifty years old (2.2%).

Table 1: Distribution of aborted women according to age groups

Age (years)	No. of aborted women	% of aborted women
20≤	23	13.3
21-30	77	44.6
31-40	43	24.9
41-50	26	15.0
≥50	4	2.2
Total	173	100

Table (2) showed that 54 (31.2%) out of 173 aborted women were infection with Toxoplasmosis, while 23 (13.3%) represented infection with Cytomegalovirus, only 7 (4.1%) were infections with both Toxoplasmosis and Cytomegalovirus and 89 (51.5%) were without any infections.

Table 2: Seropositivity of each infection agent

Infections	No. of +ve cases	% of +ve cases
Toxoplasmosis	54	31.2
CMV	23	13.3
Toxoplasmosis +CMV	7	4.1
No infections	89	51.5
Total	173	100

The VIDAS test in this study recorded a percentage of positive *T. gondii* IgG and IgM antibodies in sera of aborted women 66(38.15%), while the positive percentage of Cytomegalovirus were 30(17.34%). twenty three 23 (13.3%) were represented the positive anti-toxoplasmosis IgG and anti-toxoplasmosis IgM found in 43 (24.9%), while anti-cytomegalovirus IgG and IgM represented 7(4.1%), 23(13.3%) respectively showed in Table 3.

Table 3:Seroprevalence IgG and IgM of Toxoplasmosis and CMV infections among aborted women.

Age	Total No.	No. of +ve anti- toxoplasmosis Ig's				No. of +ve anti- CMV Ig's				No. of –ve Anti Toxo &Anti CMV
		IgG	%	IgM	%	IgG	%	IgM	%	
20≤	23	5	2.9	4	2.3	1	0.6	7	4.1	6
21-30	77	11	6.4	23	13.3	4	2.3	8	4.6	31
31-40	43	4	2.3	13	7.5	2	1.2	7	4.1	17
41-50	26	3	1.6	3	1.6	0	0	1	0.6	19
≥50	4	0	0	0	0	0	0	0	0	4
Total	173	23	13.3	43	24.9	7	4.1	23	13.3	77
		66 (38.15%)				30 (17.34%)				77 (44.50)

Discussion

In current study we found that the higher rate of aborted women in age group between 21- 30 years old (44.5%). These results agree with many previous Iraqi studies which showed that the higher rate in abortion in ages group between 20- 29 years (13, 14). They are highly relationship between abortion and the age excepts in the youngest age group(15). The abortion rates show an inverted u-shaped pattern by women's age. It was observed that the highest rate of abortion was in age group between 20–24 year olds, in twenty three out of forty one countries (16). Also many studies reported that the increased risk for abortion and infertility with women age. The happening of chromosomally abnormal eggs dramatically increased with the age. Also showed that the older women have fertility problems because declining egg quality, and other problem which that more current in older women(17).

Also in present study we observed that 31.2% of infections were Toxoplasmosis infections, while 13.3% represented infections with Cytomegalovirus, and 4.1% of infections were with both Toxoplasmosis and Cytomegalovirus. This result similar with several previous study which indicated that actual relation between *T. gondii*, CMV and abortion in women, and it was found that 43% from pregnant women with high delivery risk factors (HDRF) infected with *T. gondii*, which is known the main reason for cases of recurrent pregnancy (18). During the acute phase of mother infection the congenital transmission for *T. gondii* is occur and evaluate the IgM antibodies in the sera of the mother (19, 20). More than 90% of pregnant women who acquire a primary infection during gestation are asymptomatic (21). Infection within the first two trimesters may result in death of the fetus in utero or spontaneous abortion while the infection in the last trimester usually results in newborns that are asymptomatic at birth, but may develop symptoms later in life (3).

The seroprevalence of CMV is vary in the worldwide (22). In developed countries the seropositivity of HCMV ranges between 30-90% of human population, and the increasing of prevalence is parallel with the age (23).In Iraq, many studies conducted to detect the seropositivity of CMV in aborted women, and the seropositivity of CMV in AL-Anbar province was 6.1% (26), in waste province was 60.2% (13), in Baghdad province was10% (27),15.7% (14), 9.3% (26), and in sulimania province was 9.18% (27). Risk factors for CMV infection have been correlated with the socioeconomic status within a community (28, 29). Other studies observed that the accumulation of

cytotoxic T lymphocytes (CD28 effector) in elderly persons provided protection against symptomatic CMV disease. This is a characteristic feature of all age groups but is most obvious in elderly persons (30). In women with primary infection, the early abortion occurring because during infection of placental, HCMV impairs cytotrophoblast differentiation and invasiveness. In addition, HCMV infection impairs cytotrophoblast expression of HLA-G, thus activating the maternal immune response against the cytotrophoblast subpopulation expressing this molecule (31). Furthermore, Failure of the systemic and uterine vasculature to adapt during pregnancy leads to several complications, including preeclampsia and intrauterine growth retardation (IUGR) (32).

In this study Anti-toxoplasmosis Ig's and anti- CMV Ig's were detected by using VIDAS technique. It was found anti –toxo IgM, IgG in 24.9% and 13.3% respectively. The percentage of anti-toxo IgM in our study higher than the results studies of (24) 2% and (33) 19.17% which were detected the specific IgM of *Toxoplasma* among women with abortion, and lower percentage when compared to (13) 45.2% . In this study the VIDAS technique was chosen for the detection of IgM, and IgG anti-*Toxoplasma gondii* due to that acute Toxoplasmosis is usually diagnosed on the basis of IgM antibody detection in acute infections, and the IgG, IgM antibodies levels increase within 1-2 weeks of infection in general (34). The aim of detection of specific IgM and IgG for *T. gondii* has been used to determination the time of infection, and the negative result of IgM test with a positive result of IgG are usually indicate that that the infection occurred at least six months ago (35).

Anti- CMV IgM, IgG were found in 13.3% and 4.1% respectively. The percentage of CMV IgM in current study higher than the results studies of (26) 2%, (14) 10% and (27) 11.43% which detect the specific IgM of CMV among women with abortion, and lower when compared to (13) 39.8 %and (25) 15.7%. Primary CMV infection in an individual can be detected by demonstration of CMV specific IgM antibody, also primary infection in pregnancy has a higher incidence of symptomatic congenital infections and fetal loss (36). The higher rates of T. gondii and CMV infection among women with abortion and their differences with other studies from different countries or differences between different localities within a country may be due to differences in socio-demographic characteristics of the samples included in this study. In addition to socio-economic status, eating habits, household contact to animals, climatic conditions, availability of felines, level of hygiene, educational level, sensitivity and specificity of various employed serological techniques and or inter researchers differences in interpretation of serological technique (3,37).

In this study we observed that the higher distribution of IgG and IgM specific for *T. gondii* and CMV according to maternal age groups, in age group between 21-30 years old. This finding is agreement with other studies (24, 25, and 38).This finding may be attributed to poor hygiene, low standard of living, cutting meat, indoor contact with domestic animals, especially cats. All these factors may increase the chance for exposure to these microbial agents (37 and 39).

In conclusion, the results of our study confirm a high prevalence of *T. gondii* and CMV infection among women with abortion. Toxoplasmosis and CMV infection increased in age group between 21-30 years. serological screening program for early detection of toxoplasmosis and CMV infection in pregnant and aborted women in Iraq is necessary.

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الانتشار المصلي للمقوسات الكوندية *T.Gondii* والفايروس المضخم الخلايا *Cytomegalovirus* في النساء المجهضات في مدينة سامراء

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الملخص

اجريت هذه الدراسة للتحري عن العلاقة بين الاصابة بداء المقوسات الكوندية Toxoplasmosis، داء الفايروس المضخم للخلايا Cytomegalovirus وحدوث الاجها ض في النساء. تم تسجيل 173 حالة اجهاض في النساء اللاتي كن يراجعن مستشفى سامراء العام للفترة ما بين تشرين الاول 2015 – نيسان 2016، وكانت اعمارهن تتراوح مابين اقل من 20 – 50 سنة واكبر. التشخيص باستخدام تقنية VIDAS اظهر وجود اجسام مضادة لطفيلي T. Gondii في 54 (31,2 %) من النساء المجهضات, بينما وجد ان 23 (13,3 %) من النساء المجهضات كن مصابات بفايروس المضخم للخلايا Cytomegalovirus و 7 (4,1 %) كن مصابات بكلا المقوسات الكوندية والفايروس المضخم للخلايا. اظهرت الدراسة ايضا ان 77(44,5 %) من النساء المجهضات كانت اعمارهن تتراوح مابين 21– 30 سنة، وان الاجسام المضادة من نوع IgM و IgG الخاصة بطفيلي المقوسات الكوندية T.Gondii شخصت في 66 (38,2 %) من النساء المجهضات، بينما الاجسام المضادة من نوع IgM و IgG الخاصة بفايروس المضخم للخلايا Cytomegalovirus فقد شخصت في 30 (17,34 %) من النساء المجهضات.