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Prevalence of *Toxoplasma gondii*, *Cytomegalovirus* and *Rubella virus* among aborted women in Samarra city

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Abstract

The aim of this study is to determine seroprevalence of *Toxoplasma gondii*, CMV and *Rubella virus* for 158 aborted women in Samarra General Hospital through period from January to December 2016. The prevalence of *T. gondii* was 14.6%, CMV 10.8%, *Rubella virus* 8.2% and common Toxo. & CMV was 9.5%. Also, the present study showed that infection with each of *T. gondii*, CMV and *Rubella* were highest (24.2%, 15.2%, 15.2% respectively) in age group 21-30 years old, while common infection with Toxo. & CMV was highest 11.8% in age group 14-20 years old. The seroprevalence results were for anti-*Toxo*. IgM was 7%, IgG was 3.2%, and IgM & IgG was 4.4%, anti-CMV IgM was 5.7%, IgG was 1.9%, and IgG & IgM was 3.2% and anti-*Rubella* IgM 3.8%, IgG 1.9%, and IgG & IgM was 2.5%. While the seroprevalence of both *Toxo*. & CMV was anti-*Toxo*. IgG & anti-CMV IgM was 0.63%, anti-*Toxo*. IgM & anti-CMV IgM was 2.5%, anti-*Toxo*. IgG & anti-CMV IgG & IgM was 1.9%, anti-*Toxo*. IgM & anti-CMV IgG & IgM was 3.2% and anti - *Toxo*. IgM & anti-CMV IgG was 1.3%.

Introduction

Abortion is an elimination of fetus or embryo out women uterus. An abortion includes purposely (induced abortion) and may be caused spontaneously (miscarriage)[1] which causes emotional distress for parents[2] .

many clinical types of abortion includes Complete, incomplete, threatened, missed, septic and non septic abortion. As well as many factors has been caused spontaneously. Abortion included uterine and genetic abnormalities, pollutants of environment, endometriosis, psycho-genetic factors[3]. For infectious agents such as *cytomegalovirus* and *Toxoplasma*, it is believed that 10-15% of miscarriage caused by those agents[4].

Toxoplasma gondii is one of intracellular widespread parasite[5] which infects human accidently by ingestion of food water or soil contained oocysts of the parasite or by eating raw \undercooked meat containing cysts of *T. gondii*[6]. Human *Cytomegalovirus* is one of congenital malformation causes in both progressing and non progressing countries which responsible for asymptomatic infection to severe fetal damage[7].

Generally, infection of *Rubella* is an asymptomatically childhood disease, but through the pregnancy first trimester it responsible for congenital defects or fetal death congenital rubella syndrome (CRS)[8].

The chief aim of the current study is detection of antibodies to *Toxoplasma gondii*, *Cytomegalovirus*, *Rubella virus* and association infection of both *Toxo.* & CMV. Also, determine the potential role of those infectious agents in the incidence of abortion in aborted women attending General hospital in Sammarra city in Salah al-Din province.

Materials and methods

The study includes 158 aborted women attending Samarra General Hospital through the period from January to December 2016 to determine prevalence of antibody to *Toxoplasma gondii, Cytomegalovirus* and *Rubella virus*. Blood samples were examined for all aborted women to detection the presence of IgM & IgG to infectious agents. The ages of study groups ranged from 14-46 years old, Enzyme Linked Immunosorbent Assay (ELISA) were used to detect specific antibodies to *Toxo*., CMV and *Rubella* (from Biocheck, CA, USA), for association infection of *Toxo*. & CMV it was used (ELISA) Kit (Acon forsight\Germany).

Results

A total 158 aborted women were screened in Samarra General Hospital and the results were as follows:- The percentage of *Toxo. gondii* was 14.6%, CMV was 10.8%, *Rubella virus* was 8.2% and common *Toxo*. & CMV were 9.5%. Table (1).

Table (1):- The prevalence of infectious agents among 158 aborted women

infectious agent	No.	%
Toxoplasma gondii	23	14.6
Cytomegalovirus	17	10.8
Rubella virus	13	8.2
Toxoplasma gondii& Cytomegalovirus	15	9.5
Total	68	43.03

The prevalence according to age groups in this study was:- for *Toxo.* was 5.9% in age group 14-20 years old, 24.2% in age group 21-30 years old and 8.6% in age group 31-46 years old.
For CMV was 8.8% in age group 14-20 years old, 15.2% in age group 21-30 years old and 6.9% in age group 31-46 years old. For *Rupella virus* was 2.9% in age group 14-20 years old, 15.2% in age group 21-30 years old and 3.4% in age group 31-46 years old. While the prevalence of association infection of *Toxo.* & CMV was 11.8% in age group 14-20 years old, 10.6% in age group 21-30 years old and 6.9% in age group 31-46 years old. Table (2).

Table (2):- The prevalence of infection according to age groups.

Ages (years)	No. of tested women	infected women with *T.gondii*		infected women with CMV		infected women with *Rubella virus*		Infected women with Toxo. & CMV	
		No.	%	No.	%	No.	%	No.	%
14-20	34	2	5.9	3	8.8	1	2.9	4	11.8
21-30	66	16	24.2	10	15.2	10	15.2	7	10.6
31-46	58	5	8.6	4	6.9	2	3.4	4	6.9
Total	158	23	14.6	17	10.8	13	8.2	15	9.5

The seroprevalence of anti-infectious agents immunoglobulins were:- for anti-*Toxo.* IgM was 7%, anti-*Toxo.* IgG was 3.2% and anti-*Toxo*. IgM & IgG were 4.4%. For anti-CMV IgM was 5.7%, anti-CMV IgG was 1.9% and anti-CMV IgM & IgG were 3.2%. For anti- *Rupella* IgM was 3.8%, anti- *Rupella* IgG was 1.9% and anti- *Rupella* IgM & IgG were 2.5%. Table (3).

Table (3):- The seroprevalence of anti-Infectious agents immunoglobulins among 158 aborted women.

Infectious agents	IgM		IgG		IgM & IgG	
	No.	%	No.	%	No.	%
Toxoplasma gondii	11	7	5	3.2	7	4.4
Cytomegalovirus	9	5.7	3	1.9	5	3.2
Rubella virus	6	3.8	3	1.9	4	2.5

The seroprevalences of both anti-*Toxo*. & anti-CMV were anti- *Toxo*. IgG & anti-CMV IgM were 0.63%, anti-*Toxo*. IgM & anti-CMV IgM were 2.5%, anti-*Toxo*. IgG & anti-CMV IgG & IgM were 1.9%, anti-*Toxo*. IgM & anti-CMV IgG & IgM were 3.2% and anti-*Toxo*. IgM & anti-CMV IgG were 1.3%. Table (4).

Table (4):- The seroprevalence of association infection of *Toxo*. & CMV.

Immunoglobulins	*Toxoplasm1a gondii & Cytomegalovirus*	
	No.	%
Toxo IgG & CMV IgM	1	0.63
Toxo. IgM & CMV IgM	4	2.5
Toxo. IgG & CMV (IgG & IgM)	3	1.9
Toxo. IgM & CMV (IgG & IgM)	5	3.2
Toxo. IgM & CMV IgG	2	1.3

Discussion

Toxoplasma, CMV and *Rubella* are important infectious agents causing infections which be mild or asymptomatic in the mother. priviuos agents may result in dangerous congenital abnormalities such as intra-uterine growth, retardation, and even fetus death[1].
This study found that infection of *T. gondii* was 14.6%, it is differ from a study conducted in Al-Baiji[9], Najaf [10] and in Waste [11]. While the infection percentage of CMV was 10.8%, *Rubella virus* was 8.2% and common Toxo. & CMV were 9.5% respectively, it is differ from those reported in Waste[11], and Baghdad[12].
Add to the present study revealed that infection with *T. gondii,* CMV and Rubella were highest 24.2%, 15.2%, 15.2% respectively in age group 21-30 years old, while common infection with Toxo. & CMV was highest 11.8% in age group 14-20 years old.
Prevalence rate of infectious agents in this study probably due to the lack of presence of vaccination for *T. gondii* and CMV[9]. lack of drinking water chlorination in area of our study, increased number of stray animals especially in resent years may also contribute to the high rates and may be poverty about simple protective measures such as flushing all vegetables and fruits , hand washing , In addition to that, most of the families in the study area still raise cattle.
If a pregnant woman receives her exposure to *T. gondii* while the first three months of her pregnancy, the fetus will be at risk of abortion or congenital problems such as hydrocephalus, microcephalus and mental retardation. Being the parasite in uterus leads either chronic endometritis which interfere with fertilized egg or transferring through placenta to the fetus causing death[13].
CMV infections are mightily associated with popular life style, bad hygienic conditions[14]. However, we didn't collect data on *Rubella virus* vaccination from the women, so probably those aborted woman unvaccinated to prevent congenital rubella syndrome. women who contact with these viruses during the first three months of pregnancy will be affected. The

viruses invade the placenta and fetus during pregnancy causing birth to child with serious congenital problems such as blindness and deafness [15].

The seroprevalence of anti-infectious agents immunoglobulins in this study were for anti-*Toxo.* IgM was 7%, anti-*Toxo.* IgG was 3.2% and anti-*Toxo*. IgM & IgG were 4.4%. For anti-CMV IgM was 5.7%, anti-CMV IgG was 1.9% and anti-CMV IgM & IgG were 3.2%. For anti- *Rupella* IgM was 3.8%, anti- *Rupella* IgG was 1.9% and anti- *Rupella* IgM & IgG were 2.5%. Our previous results differ from that study conducted by Sadik *et. al.*[16] and those reported in each of Thiqar[17], Baghdad[12] and Kirkuk[18].

Also the seroprevalences of both anti-*Toxo*. & anti-CMV were for anti- *Toxo*. IgG & anti-CMV IgM were 0.63, anti-*Toxo*. IgM & anti-CMV IgM were 2.5%, anti-*Toxo*. IgG & anti-CMV IgG & IgM were 1.9%, anti-*Toxo*. IgM & anti-CMV IgG & IgM were 3.2% and anti-*Toxo*. IgM & anti-CMV IgG were 1.3%. those previous results differ from those reported in AL-Diwaniyah[19] and Thiqar[17]. The differences between our study results and these of previous studies may be due to the sensitivity differences between the serological tests, different numbers of tested women, the variations regions even within the same country.

T. gondii is the causative of toxoplasmosis, which its prevalence rates in the world may be changeable according to many factors, such nutritional habits (unwashing hands after contact with raw meat or contact with cats pets and consuming raw vegetables), lifestyle spicily most of the families in the study area still raise cattle and Lack of knowledge of the parasite and its prevalence methods and the risk of the pregnant woman infection by awareness programs and unavailability of vaccine against the parasite[20].

The prevalence of CMV infections are associated with poor hygienic, low socio-economic level and crowded living conditions[21] specially The lifestyle of families living in large numbers is common in the society in which our study was conducted. embryonic CMV infection may happen following both primary and recurrent infection and reinfection with a new strain of the virus or latent infection reactivation can cause infections even in the being of IgG levels[20].

Risk for congenital Rubella should be done meticulously, even the rate of positive anti-Ruballa IgM antibodies to be low[22]. Although successful rubella vaccine have been implemented in Iraq, the World Health Organization showed that Rubella is present in our country[23] and Majeed *et. al.,*[24] showed that there is an reduce of rubella immune which may be due to disturbance of the vaccination program in the time from 1992 to 2016, in addition to waning of vaccine stimulated immunity among women whom had received only one dose of Rubella vaccine.

A positive result of IgM for each of *T. gondii*, *Rubella* ,and CMV may not always indicate a new primary infection. False-positive IgM results may occur in patients with autoimmune diseases due to the presence of rheumatoid factor and antinuclear antibodies or in patients recently infected with other viral pathogens due to heterotypic IgM antibody reactivity[25] specially we do not provide data about whether or not these women infected with another disease or how many times they have aborted.

In conclusion, more studies about common infection of both *T. gondii* and CMV should be conducted and their relationship to abortion.

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إنتشار طفيلي المقوسة الكوندية و فيروس المضخم للخلايا وفيروس الحصبة الألمانية في النساء المجهضات في مدينة سامراء

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الملخص

هدفت الدراسة الحالية تقييم نسبة الإصابة (مصلياً) لطفيلي المقوسات الكوندية والفيروس المضخم للخلايا وفيروس الحصبة الألمانية لـ 158 امرأة مجهضة في مستشفى سامراء العام خلال الفترة من كانون الثاني إلى كانون الأول 2016. حيث كانت نسبة الإصابة لكل من طفيلي المقوسة الكوندية 14,6%، وفيروس الحمى السوداء 10,8%، فيروس الحصبة الألمانية 8,2%، إصابة مشتركه لكل من طفيلي داء القطط وفيروس المضخم للخلايا 9,5%. فضلاً عن ذلك فقد بينت الدراسة الحالية إن الإصابة بطفيلي المقوسة الكوندية وفيروس الحمى السوداء وفيروس الحصبة الألمانية كانت الأعلى (24,2%، 15,2%، 15,2% على التوالي) في المجموعة العمرية 21–30 سنة، بينما الإصابة المشتركة لكل من طفيلي المقوسة الكوندية وفيروس الحمى السوداء كانت الأعلى (11,8%) في المجموعة العمرية 14–20 سنة. بينما كانت النسبة المؤية لضد المقوسة الكوندية IgM 7%، IgG 3,2% و IgM & 4,4IgG% ، والنسبة المؤية لضد فيروس المضخم IgM 3,8%، IgG 1,9%، و IgG & IgM 2,5%. أما النسبة المصلية للإصابة المشتركة لكل من طفيلي المقوسة الكوندية وفيروس المضخم للخلايا فقد كانت ضد المقوسة الكوندية IgG وضد فيروس المضخم للخلايا IgM 0,63%، ضد المقوسة الكوندية IgM وضد المضخم للخلايا IgM 2,5%، ضد المقوسة الكوندية IgG وضد فيروس المضخم للخلايا IgG & IgM 1,9%، ضد المقوسة الكوندية IgM و ضد فيروس المضخم للخلايا IgG &IgM 3,2% و ضد المقوسة الكوندية IgM و ضد فيروس المضخم للخلايا IgG 1,3%.