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The seroprevalence of toxoplasma gondii and cytomegalovirus in aborted women in al Diwaniyah province

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Abstract

Background: Recurrent abortion (RA) is common in the general population, and it varies by community. The aim of this paper is to determine the prevalence of Toxoplasmosis and cytomegalovirus infection among aborted women in Al- Diwaniyah Province. Toxoplasmosis is a parasitic disease caused by the protozoan Toxoplasma gondii, which infects humans, warm-blooded domestic and wild animals. Human cytomegalovirus (HCMV) is one of the most well-known and common DNA viruses due to its ease of transmission via bodily fluids and excretions.

Subject and methods: The study was done in Al-Diwaniayh province. The collection time has been extended from November 2023 to January 2024. A 100 pregnant women were recruited as patients from the Women's and Children's Teaching Hospital. Suspected patients ranged in age from 15 to 45 years, with a mean of 25.86 ± 6.56. Anti-toxo and anti-CMV IgM and IgG antibodies were measured using the ELISA technique (DRG kit - ELISA, USA), as per the instructions provided by the manufacturer.

Results: The study included 60 aborted women who were monitored for HCMV and T. gondii infection by IgG and IgM tests. The findings demonstrate that 28 (46.7%) of patients have active HCMV infection, as evidenced by positive IgM results. The IgG results indicate that 54 (90.0%) of patients have had past HCMV infection. The study found that 38 (63.3%) patients had active T. gondii infection, as indicated by positive IgM findings. 14 (23.3%) individuals had positive IgG results, indicating a prior infection.

Conclusion: The current investigation discovered a significant level of HCMV IgG seropositivity among aborted women in Al-Diwaniayh province, as well as a high seroprevalence of Toxoplama-IgM among aborted women.

Keyword : Pregnant women; Toxoplasmosis ;- Cytomegalovirus; ELISA; Prevalence.

INTRODUCTION

Toxoplasma gondii is a protozoan parasite that lives within its host and is obligate intracellular. It may infect any animal that has a warm-blooded host. Human beings, birds, and rodents are all examples of creatures with a warm- blooded metabolic system. Additionally, both domesticated cats and wild cats may play an important role in the transmission of the disease [1] .The vast majority of T. gondii infections are asymptomatic; nevertheless, some people who are infected might acquire clinical indicators of toxoplasmosis, such as lymphadenopathy, chorioretinitis, and meningoencephalitis [2,3] Asymptomatic T. gondii infections make up the bulk of all T. gondii infections. The majority of T. gondii infections do not produce any noticeable symptoms in the host. People who are immunocompromised and have a reactivation of a T. gondii infection have an increased chance of having a condition that affects the central nervous system and has the potential to be fatal [1,2]. T. gondii may result in issues in a variety of the host's organs when it has established an infection[4] Infections of the pancreas caused by T. gondii have been shown to be possible in both humans and other species as well. In humans, a T.gondii infection may result in the development of pancreatitis as a complication [5].T.gondii is responsible for the development of tissue cysts, which are responsible for the development of pancreatitis and tissue necrosis in both koalas and cats[6].

Human cytomegalovirus (HCMV) has been associated with humans for years and is now the most prevalent virus worldwide. In poor countries, the infection rate of species-specific HCMV is 65-80%, while it is 80-100% in developed nations among pregnant women (7,8,9). Cytomegalovirus is one of the most widely recognized and widespread DNA viruses due to its ease of transmission via bodily fluids and excretions. It belongs to the Herpesviridae family and the Betaherpesvirinae subfamily, so it, like other members of the group, has the power to cause and reactivate latent infections (10). CMV is a commonly transmitted virus that infects people of all ages. It is the most common cause of uterine infections and birth abnormalities. It is also a significant worry for immunocompromised.

MATEIAL AND METHODS COLLECTION OF SAMPLE

The study was conducted in Al-Diwaniayh province. The collection period lasted from November 2023 to January 2024. The patient group consisted of 100 pregnant women who attended Women's and Children's Teaching Hospital. The average age of suspected patients was 25.86 ± 6.56, with a range of 15-45 years. A 3 ml of blood from pregnant women were taken in gel test tubes by vein punctures and centrifuged at 3000 revolutions per minute for five minutes.

Sera were stored in plane tubes and frozen until serological testing was performed on them. Anti-Toxo IgG and IgM antibodies, as well as anti- CMV IgG and IgM antibodies, were found.

STATISTICAL ANALYSIS

Data were gathered, summarised, analysed, and presented using SPSS version 26 and Microsoft Office Excel 2010. The numerical data were provided as mean, standard deviation, and range. The difference in mean between any three groups was investigated using an independent samples t-test, assuming that the variable was normally distributed.

RESULTS

The study included 60 aborted women who were monitored for HCMV and T. gondii infection by IgG and IgM tests. The findings demonstrate that 28 (46.7%) of patients have active HCMV infection, as evidenced by positive IgM results. The IgG results indicate that 54 (90.0%) of patients have had past HCMV infection. The study found that 38 (63.3%) patients had active T. gondii infection, as indicated by positive IgM findings. 14 (23.3%) individuals had positive IgG results, indicating a prior infection.

Table (3-1): Number and percentage of infected patients with *HCMV and T. gondii* according to the IgG and IgM positive result diagnosed by ELISA test

Infection type	***Total No.***	***IgG positive***	***IgM positive***	***P value***
ELISA diagnostic test				
HCMV	60	54 (90.0%)	28 (46.7%)	0.001*
T. gondii	60	14 (23.3%)	38 (63.3%)	0.001*
P value		0.001*	0.218	

¥: Chi-square test; *: significant at $P \leq 0.05$.

The findings demonstrate that 28 (46.7%) of patients have active HCMV infection, as evidenced by positive IgM results. The IgG results indicate that 54 (90.0%) of patientshave had past HCMV infection. The study found that 38 (63.3%) patients had active T. gondii infection, as indicatedby positive IgM findings. In the IgG test, 14 (23.3%) individuals had positive results, indicating prior infection.

Table (3-2): ELISA test to determine the prevalence of HCMV and T. gondii among different age groups.

Test	**Age group**	***HCMV+/-***	***T. gondii +/-***	X^2	***P value***

IgG	< 20, *n* (%)	4/2 (66.7%)	1/5(16.7%)	3.086	0.079
	20-29, *n* (%)	28/3 (90.3%)	7/24 (22.6%)	28.933	0.001*
	≥ 30, *n* (%)	22/1 (95.7%)	6/17 (26.1%)	23.365	0.001*
X^2		4.450	0.456		
P value		0.108	0.880		
IgM	< 20, *n* (%)	4/2 (66.7%)	4/2 (66.7%)	0	1.000
	20-29, *n* (%)	13/18 (41.9%)	19/12 (61.3%)	2.325	0.127
	≥ 30, *n* (%)	11/12 (47.8%)	15/8 (65.2%)	1.415	0.234
X^2		1.256	0.120		
P value		0.534	0.942		

¥: Chi-square test; *: significant at P ≤ 0.05.

Regarding to diagnostic tests, the frequency distribution of patients *HCMV IgG* positive infection according to residence included 41 cases from urban areas and 13 cases from rural areas, while in the case of patients with *HCMV-IgG* negative according to residence 5 cases from urban areas and 1 cases from rural areas, and the frequency distribution of patients with *HCMV-IgM* positive infection according to residence included 22 cases from urban areas and 6 cases from rural areas, while in the case of patients with *HCMV-IgM* negative according to residence, 24 cases from urban areas and 8 cases from rural areas, and the difference was significant (P = 0.744). While the frequency distribution of patients infected with *T. gondii-IgG* positive according to residence was 10 cases from urban areas and 4 cases from rural areas, while in the case of patients infected with *T. gondii-IgG negative* according to residence, 36 cases were recorded from urban areas and 10 case from rural areas, while the frequency distribution of patients infected with *T. gondii-IgM positive* according to residence included 30 cases from urban areas and 8 cases from rural areas, while in the case of patients infected with *T. gondii-IgM negative* according to residence 16 cases from urban areas and 6 cases from rural areas rural areas, and the difference was non-significant (P= 0.583).

Table (3): Number and percentage of *HCMV and T. gondii* infection according to the residency by ELISA test.

Test	**Residency**	***HCMV+/-***	***T. gondii +/-***	***X^2***	***P value***
IgG	Urban	41/5 (89.1%)	10/36(21.7%)	42.282	0.001*

	Rural	13/1 (92.9%)	4/10 (28,6%)	9.123	0.003*
X^2		0.166	0.280		
P value		0.684	0.597		
IgM	Urban	22/24 (47.8%)	30/16 (65.2%)	2.831	0.092
	Rural	6/8 (42.9%)	8/6 (57.1%)	1.292	0.256
X^2		0.106	0.701		
P value		0.744	0.583		

¥: Chi-square test; *: significant at $P \leq 0.05$.

DISCUSSION

Toxoplasma and CMV are important infectious agents causing infections which be mild or asymptomatic in the mother, some time mild infection to pregnant women but can have much more danger for the embryo (11) The present study show 28 (46.7%) of patients have active *HCMV* infection by finding positive results for IgM. Whereas the IgG findings show 54

(90.0%) of patients have previous *HCMV* infection. CMV infections are mightily associated with popular life style, bad hygienic conditions (12) The present results show 14 (23.3%) of

aborted women have positive results of *T. gondii* IgG in compared with 64 (76.7%) was negative. The continued production of IgG is one of the most important fundamental elements of the humoral immune response to regulate the parasite and limiting its spread. These antibodies work on the teaching of rapid prophase differentiation by receptors of type Fraction crystallizable phagocytes that results in the process of opsonization and common phagocytosis of the very quickly proliferating phase covered with antibodies (13). This finding is lower than the findings of (14), which were done for 210 women (180 women suffering from repeated miscarriages and 30 women with normal healthy pregnancy as a control group) and identified by Rabid test and ELISA method for the purpose of identifying their infection with TORCH.So the seropositivity by Rapid test was 70 (38.9%) out of 180 abortion cases, whereas 86 (47.7%) were recorded by ELISA, showing that the findings of the diagnosis by Rabid test, an approach to the diagnostic results by an ELISA test for the purpose of immunological detection of TORCH infection. The present results show highest infection rate of *HCMV* with IgG was 28 cases in the 20-29 years group followed 22 cases in more than 30 years age group. While highest infection rate of *T. gondii* with IgG was 7 cases in the 20-29 years group followed 6 cases in more than 30 years age group. This group was more susceptible to be infected by *HCMV and toxoplasmosis* which is similar to the results of the studies that showed that the highest

prevalence *T. gondii* IgG antibody was found among the pregnant women of young age (10-20 years), while the ages range 41-50 years had the least prevalence (25.0%) and these results match the results of other studies conducted in various countries (15).

CONCLUSIONS:

The present research found a considerable level of HCMV IgG seropositivity among aborted women in Al-Diwaniayh province, as well as a high seroprevalence of Toxoplama-IgM among them.Aborted women in rural regions were more likely to have HCMV and Toxoplasmosis. The study demonstrated a significant correlation (P<0.003) between HCMV, Toxoplasma gondii IgG, seropositivity, and location of residence.

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