Association between the Infection by Cytomegalovirus (CMV) with Acute and Chronic Toxoplasmosis among Random Sample of Aborted Women at Baghdad Province

Salah Mehdi Hassan [(1)], Amany M. Al-Kaysi [(2)] and Amal Kamel [(3)]

[(1)]College of Health and Medical Technique\ Middle Technical University Baghdad- Iraq

Email: salahmad00ss00@gmail.com

[(2)]Email: amanimohamed320@ymail.com
[(3)] Email: amalar7070@gmail.com

Abstract

This study was carried out during the periods from September 2017 to march 2018 in laboratories Department of different hospitals /Baghdad Teaching Hospital, and Abn-Abalady hospital in 70 women ages ranged from 20 year to 33 years .Bio-ELISA immuno-enzymatic assay was used for Cytomegalovirus Ab sera

Immunoassay for the detection of *Toxoplasma antibodies* IgG and IgM also were carried out to all samples included.The results showed No significant differences between age group studied in pregnant and non-pregnant women in all sample studied and recoded that 25(46.3%) out of 34(63%) of pregnant women studied had Toxo-IgG antibodies and pregnant women who had CMV infections were 28(51.9) out of 34(63%) the results also showed that the infection with Cytomegavirus infection was significantly higher than *T. gondii*. Antibodies.

***Keywords*:** CMV. *Toxoplasma.* Antibodies. Immunoassay, symptoms, TORCH

دراسة ارتباط الاصابة بين Cytomegalovirus الاصابة بداء المقوسات الكونيدية الحاد والمزمن في عينة عشوائية النساء في محافظة بغداد

م.د. صلاح مهدي حسن ، أ.م.د.أماني محمد جاسم و م.د. امال كامل عبد السادة

الخلاصة

اجريت الدراسة الحالية مابين ايلول 2017 ولغاية نيسان 2018 في المختبرات التابعة لبعض المستشفيات مستشفى بغداد التعليمي ومستشفى ابن البلدي على 70 عينة تراوحت اعمارهم بين20-33 سنة.

استخدم فحص الاليزا في التحري عن الاجسام المضادة لفايروس Cytomeglovirus وكما استخدمت الطرق المناعية للتحري عن الاجسام المضادة نوع IgG, IgM لطفليي داء المقوسات .اوضحت نتائج الدراسة انه لا يوجد فرق معنوي بين اعمار النساءالحوامل, وغير الحوامل كما سجلت الدراسة ان (46,3%) 25 من مجموع 34 (63%) من النساء لديهن اجسام مضادة نوع IgG كما كانت نسبة النساء الذين لديهم اجسام مضادة لفايروس Cytomeglovirus (51, 9%) 28

كما اوضحت الدراسة ان نسب الاصابة بcytomeglovirus هي معنويا هي الاعلى من نسب الاصابة بطفيلي Toxaplasma gondii.

الكلمات المفتاحية: فايروس الدجاج , داء المقوسات,الاجسام المضادة ,الفحص المناعي ,الاعراض , فحص TROCH

Introduction

Bad obstetric history among women in Iraq, particularly in Baghdad was high [1, 2]. It causes prenatal and perinatal infections falling under the designation of TORCH test which involve *Toxoplasma gondii*, Cytomegalovirus(CMV), Rubella virus and herpes simplex virus (HSV) [3] .CMV can also be prenatally transmitted from mother to fetus where it is usually asymptomatic, except in premature babies[4].

Childhood infection with CMV is usually asymptomatic or causes only mild, flu-like symptoms [5].

CMV IgM detection is a sensitive marker of primary CMV infection, but its specificity is poor because CMV IgM is also produced during viral reactivation and persists following primary infection in some individuals **[6]**. Incidence of CMV in the world was fluctuated, the following rates were recorded:

Toxoplasmosis is a disease caused by *Toxoplasma gondii* a protozoan parasite that mainly transmitted to humans via the ingestion of raw or undercooked meat, exposure to oocysts through cat litter or soil or contaminated water; and congenitaliy in which maternal infection is passed transplacentally via blood to the fetus [7]. Congenital infection leads to stillbirth and severe neurological illness in some instances, although the majority of infected newborns are asymptomatic at birth and some develop sequelae such as mental retardation, blindness, and epilepsy later in life [8]. Extrapolation from regional studies suggests that ~ 400–4000 cases of congenital Toxoplasmosis occur each year in the United States [9].

Adults with normal immune function who are infected with *T. gondii* are usually asymptomatic or have self-limited symptoms (e.g., fever, malaise, and lymphadenopathy) [9]. Once infected, these individuals usually develop an immune response against Toxoplasmosis [10]. A recent study based on the National Health and Nutrition Survey conducted from 1988–1994 (NHANES III) reported that, among women aged 15–44 years, seroprevalence of *T. gondii* antibodies was 15%, suggesting that ~85% of women of childbearing age are susceptible to *T. gondii* infection [11].

Material and methods

Study groups

This study was carried out during the periods from September 2017 to march 2018 in Laboratories Department of different hospitals including (Baghdad Teaching Hospital ,and Abn-Abalady Hospital ,70 women ages ranged from 20 year to 33 years, attending these hospitals .Blood sample were collected from each women and a questioner were filled out for each individual included age sex, type of residences and medical history

Venous blood was collected from those women sera separated in clean tube then kept in freezing at -20 till used

Bio-ELISA immuno-enzymatic assay

Bio-ELISA immuno-enzymatic assay was used for Cytomegalovirus Ab sera (BioCheck, Inc.CA, USA)

Cytomegalovirus Ab present in sample will bind to the solid-phase Cytomegalovirus Ab the wells are washed to remove residual test sample, and Cytomegalovirus Ag labeled with peroxides is added.The conjugate bind to the Cytomegalovirus Ag Chromogen was added. This solution will develop a blue color then read in bichromatic mode using a 620 – 630 reference filter. The assay had been performed according to the method of Roitt *et al*. (2001) [12]

Immunoassay for the detection of TOXO antibodies (IgG /and IgM)

A qualitative membrane strip based in Serum, the test device then removed from the sealed pouch and used it as soon as possible.The dropper Hold then Hold vertically and transfer one drop of serum (approximately 10µl) to the specimen well(S) of the test device, then added two drops of buffer (approximately 80µl) color line(s) wait to appear and the results then Read [13].

Results

Table (1): The distribution of the pregnant and non-pregnant women according to the age group

Table (1):			
Age Groups	Pregnancy		Total
	No	Yes	
(20 - 26)	15	10	25
	27.8%	18.5%	46.3%
≥ 27	19	10	29
	35.2%	18.5%	53.7%
Total	33	20	53
	63.0%	37.0%	100.0%
P.value ≥ 0.6 NS			

Table (1) showed no significant differences between age group studied in pregnant and non-pregnant women at P value ≥ 0.6

Table (2): Percentage of Toxo-IgM among the pregnant and non-pregnant women studied

Table (2):			
Toxo-IgM	Pregnant		Total
	Yes	No	
Negative	33	20	53
	61.1%	37.0%	98.1%
Positive	1	0	1
	1.9%	0.0%	1.9%
Total	33	20	54
	63.0%	37.0%	100.0%
p.value ≥ 0.4 NS			

Table(2) showed the prevalence of Toxo-IgM among pregnant and non-pregnant women, The results showed only 1(1.9%) out of 34(63%) pregnant women had Toxo-IgM antibodies at P

value ≥0.4 and no significant differences were noticed in the presence of Toxo-IgM between pregnant and nonpregnant women at P value ≥ 0.4

Table (3): percentage of Toxo-IgG among the pregnant and non-pregnant women studies

Table (3):			
Toxo-IgG	Pregnancy		Total
	No	Yes	
Negative	9	20	29
	16.7%	37.0%	53.7%
Positive	25	0	25
	46.3%	0.0%	46.3%
Total	33	20	54
	63.0%	37.0%	100.0%
p.value ≥ 0.0001 HS			

Table (3) showed the prevalence of Toxo-IgG among pregnant and non-pregnant women, The results showed that 25(46.3%) out of 34(63%) of pregnant women had Toxo-IgG antibodies and high significant differences in Toxo-IgG antibodies were noticed between pregnant and non-pregnant women at P value ≥ 0.0001

Table (4): percentage of CMV among the pregnant and non-pregnant women studied

Table (4):			
CMV	Pregnancy		Total
	No	Yes	
Negative	6	20	26
	11.1%	37.0%	48.1%
Positive	28	0	28
	51.9%	0.0%	51.9%
Total	33	20	53
	63.0%	37.0%	100.0%
p.value ≥ 0.0001 HS			

Table (4) Showed the prevalence of CMV among pregnant and non-pregnant women, the results showed 28(51.9) out of 34(63%) of pregnant women had CMV infections and high significant differences were noticed between pregnant and non-pregnant women at P value ≥ 0.0001

Table (5): The distribution of infections by Toxo-IgG, Toxo-IgM and CMV among women studied

Toxoplasma Infection (acute – Chronic)		CMV –Infection			*p.value*
		Without-CMV	With-CMV	Total	
Toxo-IgM	Negative	26	27	53	0.3 NS
		48.1%	50.0%	98.1%	
	Positive	0	1	1	
		0.0%	1.9%	1.9%	
	Total	26	27	53	
		48.1%	51.9%	100.0%	
Toxo-IgG	Negative	20	9	29	0.001 S
		37.0%	16.7%	53.7%	
	Positive	6	19	25	
		11.1%	35.2%	46.3%	
	Total	26	27	53	
		48.1%	51.9%	100.0%	

Table (5) showed the distribution of infections by CMV among women who had antibodies Toxo-IgG and Toxo-IgM. Cytomegavirus infection 1(1.9%) out of 53 had antibodies Toxo-IgM and cytomegavirus infection and 19(35.2%) out of 53 had antibodies Toxo-IgG and cytomegavirus infection was higher than *T. gondii* and Significant differences were noticed between women who had Toxo-IgG and toxo IGM compared with control group at P value ≥ 0.0001

Discussion

The overall rate of *Toxoplasma* rate(46 %) in the present study is high .This high rate can reflects the degree of the environmental contamination with *Toxoplasma* infective stage the oocysts, because the present study was carried out during the critical and unstable condition facing Iraq and Baghdad Province particularly, with in the electric power was continuously interrupted that affect food storing and lead to problems in water supplies; in addition to the lack of insecticides and its good quality to kill the mechanical vectors , The overall rate of Toxoplasmosis in the present study was not agree with that recorded in the same province by[14] These findings of the regional prevalence of *T. gondii* seropostivity was higher than those detected by other previous studies in Egypt and Turkey and lower than , the results of TORCH testing suggest that approximately 65% of women of childbearing age in Qatar have no IgG antibodies to *T. gondii* (35.1% were IgG positive) Pregnant women should take appropriate precautions to protect themselves against infection. Such precautions include cooking meat, especially lamb and pork, until it is well done; thorough washing of cutting boards used to prepare meat; wearing gloves when gardening; rigorous hand washing after handling raw meat or working in the soil; and avoiding contact with cat feces [15]

ELISA immuno-enzymatic assay was used for investigaton of Cytomegalovirus antibodies in sera of samples studied the results showed No significant differences between age group studied in pregnant and non-pregnant women in all sample studied

The current study was showed no significant differences between age group studied in pregnant and non-pregnant women the prevalence of toxo-IgM among pregnant and non-pregnant women the result showed no significant differences were were noticed in the presence of Toxo – IgMbetween pregnant and non-pregnant women their results in agreement with [16] who reveled TORCH infections in pregnant women was the highest ratio of infections.

High-avidity IgG antibodies develop at least 12–16 weeks (depending on the test method used) after infection. The presence of high-avidity antibodies in the TSP indicates that infection was acquired >16 weeks earlier [17]. Thus, in a pregnant woman in the first months of gestation, regardless of the IgM antibody test result, a high-avidity IgG test result indicates that the fetus is essentially not at risk for congenital Toxoplasmosis. A high-avidity IgG test result is especially useful when only a single sample of serum has been obtained in which *T. gondii* IgM antibodies are present and for which the AC/HS test (or the TSP) reveals an acute or equivocal

pattern [18]. For pregnant women beyond 16 weeks of gestation, a high-avidity test result may be helpful in establishing that the infection was acquired at least 12–16 weeks earlier in gestation [19].

Williams [4] studied primary infection by **CMV** and recurrent infection and suggested that primary infection can cause more serious problems in pregnancy than recurrent infection However, if a person's immune system is seriously weakened in any way, the virus can become active and cause CMV disease. For the majority of people who have CMV infection, it is not a serious problem The results also revealed Cytomegavirus infection was higher than *T. gondii* and Significant differences were noticed between women who had Toxo-IgG and toxo IgM compared with control group ,this results was in agreement with Sickinger,etal [14] who decided Cytomegalovirus remains the virus most commonly responsible for congenital infection in the developed world, transplacental transmission following primary viral infection approaches the rate of 40% while in case of recurrent infection this may not exceed[20].

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