International Journal of ChemTech Research
CODEN (USA): IJCRGG, ISSN: 0974-4290, ISSN(Online):2455-9555
Vol.10 No.2, pp 641-645, 2017

Detection of *Cytomegalovirus* and *Toxoplasma* in Infant, Men and Women with Pregnancy Associated Problems in Babylon Maternity and Pediatric Hospital, Hilla City, Iraq

Haider Qassim Raheem[1], Zainab Al-Mahdi[3], Zaid Al-Mahdi[4], Nada Khalid Abo-Khumra[2]

[1,2]DNA Research Center, University of Babylon / Hilla City/ Iraq
[3]Collage of Dentistry, University of Babylon / Hilla City/ Iraq
[4]Collage of Medicine, University of Karbala, Karbala Province, Iraq

Abstract : Study aim: Cytomegalovirus (CMV) infection in pregnant women can be responsible for fetal loss or congenital malformation, cause health problem in neonate when acquired congenitally so present work aim to detect CMV in female, male and neonate and infant as well as detection of cross infection with *Toxoplasma gonidi* . Methods: In the present study CMV specific IgM and IgG antibody was detected by VIDAS in pregnant women and its association with complication was assess. Samples was taken from Babylon maternity and pediatric hospital along 2015.

CMV specific IgG and IgM antibody was detected in 203 abortion case, these divided in two age groups they are ≤ 25 (115 cases(56)), >25 88(42%) cases which are more vulnerable to infection) , these comprised 55 cases of recurrent and inevitable abortion, one time abortion, CMV infection in the presence normal child and CMV infection with absence of any child, while the study shows positive IgG among neonate and infant who have health problem (20 positive case out of 21 tested samples). CMV also found infect male with IgG mean titer 48± 20.07. results also shows mixed infection of both *Toxoplasma gonidi* and CMV in infant and neonate, female and male with the mean of titer (117±128.6, 66.54±67.28 and 19.2±3.63) for Toxoplasma respectively.

Keywords: congenital, CMV IgM, CMV IgG. Toxoplasma.

Introduction

Human cytomegalovirus (CMV) is 1 of 8 human herpesviruses. It is a member of the beta-herpesvirussubfamily[1].CMV has adapted to the human immune system and spreads among humans via viral excretion in nearly all body fluids, including urine, saliva, and semen. In most CMV infections, there is no apparent impact on the immune system, and most infected people are disease-free. Disease associated with CMV infection generally occurs when the immune system is compromised[2].Although most CMV infection are asymptomatic or cause mild disease the virus can cause serious disease in newborns and immune compromised children. Infants born congenitally infected with CMV as a result of a primary maternal infection also are much more likely to have symptoms at birth and suffer squeal than newborns born congenitally infected from a maternal recurrent CMV infection. Newborns with a primary immune disorder of cellular function (eg, severe combined immune deficiency or natural killer (NK) cell disorders) may also manifest severe or fatal congenital CMV infection[3,4].*In utero* infection may result in sequelae of varying degree including mental retardation,

chorioretinitis, hearing loss and neurologic problems. Since the risk of *in utero* virus transmission and CMV related damage of the fetus is strongly increased during primary infection, reliable recognition of primary CMV infections is of high importance for pregnant women. Thus, the presence of CMV-specific IgG antibody does not assure protection from disease[5].Cytomegalovirus (CMV) infection in pregnant women can be responsible for fetal loss or congenital malformation. In our previous study CMV specific IgM and IgG antibody was detected in pregnant women and its association with complication was assess. CMV specific IgG and IgM antibody was detected in 151(70.5%) of the 214 abortion case, the virus cause recurrent and inevitable abortion, intrauterine death, and abnormal child[6].

CMV is excreted in all secretions except tears. CMV is concentrated highest in semen and also is present in cervical and vaginal secretions. Hence, it is assumed that CMV transmission can occur via sexual activity. Adolescent reconversion to CMV frequently is associated with increased sexual activity among adolescents and with those adolescents attending clinics for sexually transmit- ted diseases. Homosexual males also have very high rates of CMV infection, presumably due to sexual activity[2].

Toxoplasmosis is a parasitic disease caused by *Toxoplasma gondii*,[7] Infections with toxoplasmosis usually cause no symptoms in adult humans[8].Occasionally there may be a few weeks or months of mild flu-like illness such as muscle aches and tender lymph nodes. In a small number of people, eye problems may develop. In those with a weak immune system, severe symptoms such as seizures and poor coordination may occur. If infected during pregnancy, a condition known as congenital toxoplasmosis may affect the child[9].

VIDAS is an automated qualitative enzyme immunoassay used as serologic tests that detect CMV antibodies (CMV IgM and CMV IgG). IgM antibodies generally do not cross the placenta during normal pregnancy presumably because of their large pentameric structure and the lack of a specific transporter mechanism, as for IgG[10].The present study use *in vivo* model of congenital CMV to evaluate humoralimmune responses in vertically infected neonates and infants, both IgG and IgM as well as look at CMV DNA viral loud with congenitally transmitted CMV.

Itt is useful in assessing the immune status of patients for this reason, this study aimed at: Detection level of CMV and Toxoplasma IgM and IgG antibodies in serum of patient have health problem including pregnant and nonpregnant women, male and infant using minividas – enzyme linked fluorescent assay ELF A.

Materials and Methods

Patients' sera

Whole blood (5ml) was obtained under aseptic conditions from each subject by a vein puncture using a disposable syringe.

Sera were obtained retrospectively from the Laboratory of children and Delivary hospital. 40 new-borns 'sera were included in the study.

VIDAS CMV and Toxoplasma IgG and CMV IgM antibody.

VIDAS CMV IgG and IgM is an automated quantitative enzyme immunoassay for use on the VIDAS family instruments for the quantitative measurement, of anti-cytomegalovirus IgG (CMVG) in human serum. Using the technique ELFA (Enzyme Linked Florescent Assay). The assay principle combines a two-step enzyme immunoassay sandwich method with a final fluorescent detection (ELFA). Assay protocol fellow the manufacture instruction[10].

Results:

Twenty out of 21 of infant and neonate show IgG positive for CMV, their age between 7 day-3 year. While their IgM titer were negative.

Table-1: Humoral immune response in neonate and infants.

Humoral Antibodies Types	No. of cytomegalo-virus seropositive patients	Conc. of IgG* and or IgM** (Iu/ml)a	Range of neonate or infant age
IgM	Negative		
IgG	20	Sum:1006; Ave.50.3 St.Dev.:31.32	7 days-3 year
IgG&IgM	Negative		
Control group	1		
IgM	< 0.7UA		
IgG	<4UA		
Total	21(no. of infant 9; No of neonate:11)		7 days-3 year

*CMV IgG Negative <4UA / ml, Equivocal ≥4 < 6UA / ml, Posative ≥ 6 UA /ml. **CMV Igm Negative < 0.7UA /ml, Equivocal ≥0.7 and < 0.9UA /ml, Posative≥ 0.9 UA /ml.

203 women with pregnancy associated problem, 115 (56%) of cases their age under 25 while 88 (42%) of cases their age were equal or higher than 25 year, Cases comprised of Recurrent and inevitable abortion, One time abortion, CMV Infection with the presence of normal Childs, CMV Infection and no child.(Table2). Male patients also shows positive CMV infection (25 positive cases), however the antibody titer in male was lower than thus recorded among women (0.05%). (Table-4).

Table 2: The nature of women reproductive problems.

A:ELISA positivity for CMV IgM&IgG antibody in different age groups.		
Age (year)	**<25 :115(56%)**	**≥25: 88 (42%)**
A: Cases comprised of:		
1- Recurrent and inevitable abortion	25	30
2- One time abortion	53	
3- CMV Infection with the prescence of normal childs	20 cases	
4- CMV Infection and no child	75	
B:Other cases (ELISA negative for CMV IgM&IgG antibody))	1	
Total cases of CMV	203	

Results shows mixed seropositive patients (Infant and neonate, female and male) for both CMV and Toxoplasma (Tabe-3).

Tabe-3 mixed infection of CMV and Toxoplasma show the titer for Toxoplasma infection

Infant and neonate	2 cases.	IgG (-VE)	IgM*: 117 ± 128.6
Female	46 cases.	IgG (-VE)	IgM: 66.54 ± 67.28
Male	5 cases.	IgG (-VE)	IgM :19.2 ± 3.63

- Mean ± Standard devation

Table-4seroposative of CMV in male

CMV seropositive male	25 case
IgM	-ve
IgG	48.9 ± 20.07
Control (2 cases)	-ve

- Mean ± Standard devation

Discussion

The present work focus on the important of CMV infection in patients have health problem in Hilla city in middle of Iraq, those patients included neonate and infant, women with pregnancy associated problem and male who have health problem, as proven before in many studies in Iraq CMV is still have the priority in causing miscarriage in women[6,11].

In the present study, the majority of newborns show higher anti-CMV IgG.(table-1). This result in agreement with Chen *et al*., who demonstrate that anti-CMV IgG can efficiently transfer from mother to their fetuses. IgG Transplacental transfer of maternal IgG to the fetal bloodstream is mediated by neonatal Fc receptor in syn- cytiotrophoblasts of the placenta and contributes to the passive immunity of newborns to pathogens[12].

The present study also showed that the women their age less than 25 years have higher percent of CMV infection (56%), while our previtious study during 2010-2012 showed the higher incidence of CMV infection with in the age group higher than 25 years age were 63%[6], so the present study suggested that CMV infection started to be earliar may be from childhood stage.

Many cases shows IgG positive for both toxoplasma and CMV, the result mean co infection of both microbes, A positive IgGtiter is sufficient in most instances for determining that a patient has been infected with Toxoplasma. Because titer of IgM and IgA may remain present for more than 12 months, a single positive result of either of these tests is not informative regarding when infection took place[13-15].

The most commonly used tests to measure IgG antibody are the DT, the ELISA, the IFA, and the modified direct agglutination test[16]IgG antibodies usually appear within a week or two of infection, peak within one to two months, then decline at various rates`[16]. *Toxoplasma*IgG antibodies generally persist for life, and therefore may be present in the bloodstream as a result of either current or previous infection[17].

In contrast to IgG, IgM antibodies can be used to detect acute infection, but generally not chronic infection[17].The IgM antibodies appear sooner after infection than the IgG antibodies and disappear faster than IgG antibodies after recovery[18].In most cases, *T. gondii*-specific IgM antibodies can first be detected approximately a week after acquiring primary infection, and decrease within one to six months; 25% of those infected are negative for *T. gondii*-specific IgM within seven months[17].However, IgM may be detectable months or years after infection, during the chronic phase, and false positives for acute infection are possible[16].

Present work also shows high titer of IgG in male with health problem or who their wife suffer from abortion cases, so the result indicate that the virus found among family. The mode of HCMV transmission from person to person is entirely unknown but is presumed to occur through bodily fluids[19]. Infection requires close, intimate contact with a person secreting the virus in their saliva, urine, or other bodily fluids. CMV can be transmitted sexually and via breast milk, and also occurs through receiving transplanted organs or blood transfusions[20].Although HCMV is not highly contagious, it has been shown to spread in households and among young children in day care centers[21-23].

Conclusion:

CMV virus infect human at any age and responsible for dangerous health problems especially in pregnant women. Suggesting the need for screening of women of child bearing age for CMV infection, male and infant and neonate for treatment to avoid the dangerous health problems.

Acknowledgements

We are extremely thankful to the DNA Research center, Babylon University for providing all the needed facilities, which are essential for successful completion of the present work.

References

1. (Schleiss MR. Persistent and recurring viral infections: the human herpesviruses. *CurrProbl Pediatr Adolesc Health Care*. 2009 Jan. 39(1):7-23. [Medline].
2. Stuart P. Adler; Beth Marshall. Pediatrics in Review Vol.28 No.3 March 2007:92-100.
3. Soderberg-Naucler C, Khanna R.(Reactivation of latent human cytomegalovirus by allogeneic stimulation of blood cells from healthy donors). Cell, 1997;91:119.
4. Harrison GJ. Cytomegalovirus. (In: Feigin and Cherry's Textbook of Pediatric Infectious Diseases), 7th, Cherry JD, Harrison GJ, Kaplan SL, et al. (Eds), Elsevier Saunders, Philadelphia,2014;1969.
5. Lazzarotto T, Gabrielli L, Lanari M, Guerra B, Bellucci T, Sassi M, Landini MP. (Congenital cytomegalovirus infection: recent advances in the diagnosis of maternal infection). *Hum Immunol.* 2004;65(5);410-15.
6. Ahmed, Z. K. , Ahmed, Z. K, Zahra Z. Q.2014. Quantitative Detection of Human Cytomegalovirus (HCMV) Gene in Iraqi Women with Pregnancy Associated Problems. Iraqi J. of Biotechnology. 13 (1): 30-38.
7. Starr SE, and Friedman HM.((Human cytomegalovirus) in Manual of Clinical Microbiology, fourth edition, edited by E.H. Lennette A, Balows, wj,Hausler, Jr. HJ,Shadomy), American Society for Microbiology, 1985; 711-19.
8. "Parasites - Toxoplasmosis (Toxoplasma infection) Epidemiology & Risk Factors"March 26, 2015. Retrieved 22 August 2015.
9. Hunter, CA; Sibley, LD (November 2012). "Modulation of innate immunity by Toxoplasma gondii virulence effectors". *Nature Reviews Microbiology*. 10 (11): 766–78. doi:10.1038/nrmicro2858. PMID 23070557.
10. Parasites - Toxoplasmosis (Toxoplasma infection) Disease". July 10, 2014. Retrieved 22 August 2015.
11. Hameed, M.Y. and Aziz, I.H. 2016. Detection of Cytomegalovirus in Iraqi recurrent miscarriage women. World. J. Pharmacy and Pharmaceutical Science. 5 (1) : 79-89.
12. Chen J, Hu L, Wu M, Zhong, T, Zhou, Y and Hu1 Y. (Kinetics of IgG antibody to cytomegalovirus (CMV) after birth and seroprevalence of anti-CMV IgG in Chinese children). JVirology, 2012; 9:304 .
13. Beazley DM, Egerman RS. Toxoplasmosis. Semin Perinatol 1998;22:332-8.
14. Wang SY, Remington JS. Toxoplasmosis in pregnancy. Clin Infect Dis 1994;18:853-61.
15. Lynfield R. Guerina N. Toxoplasmosis. Pediatr Rev 1997;18:75-83.
16. Montoya JG (2002). "Laboratory diagnosis of Toxoplasma gondii infection and toxoplasmosis". *The Journal of Infectious Diseases*. 185 Suppl 1: S73–82. doi:10.1086/338827. PMID 11865443.
17. Jones JL, Parise ME, Fiore AE (2014). "Neglected parasitic infections in the United States: toxoplasmosis". *Am. J. Trop. Med. Hyg*. 90 (5): 794–9.
18. Hill D, Dubey JP (2002). "Toxoplasma gondii: transmission, diagnosis and prevention". *Clinical Microbiology and Infection*. 8 (10): 634–40.
19. Koichi Yamanishi; Arvin, Ann M.; Gabriella Campadelli-Fiume; Edward Mocarski; Moore, Patrick; Roizman, Bernard; Whitley, Richard (2007). *Human herpesviruses: biology, therapy, and immunoprophylaxis*. Cambridge, UK: Cambridge University Press. ISBN 0-521-82714-0.
20. Taylor GH (February 2003). "Cytomegalovirus". *Am Fam Physician*. 67 (3): 519–24. PMID 12588074
21. Ryan KJ, Ray CG (editors) (2004). Sherris Medical Microbiology (4th ed.). McGraw Hill. pp. 556; 566–9. ISBN 0-8385-8529-9.
22. Salman JM, Abdul-Adel E, Alkaim AF. (2016);Effect of pesticide glyphosate on some biochemical features in cyanophyta algae *oscillatoria limnetica.* International Journal of PharmTech Research. 9(8): 355-365.
23. Abdul-HadiChabuk H, Al-Saadi HKZ, Al-Hamairy AK. (2016);Effect of the experimental infection with Toxoplasma gondii on some biochemical aspects and histological changes for the liver and spleen in female rats. International Journal of PharmTech Research. 9(11): 142-150.

*****