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The Prevalence of Cytomegalovirus Infection in a Group of Pregnant Women in Brack Al-Shati, libya

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Abstract

This study was undertaken to examine the prevalence of Cytomegalovirus in a group of women in the area of Brack Al-Shati

Serum samples were collected from 180 pregnant women attending Brack General Hospital for consultation and treatment. Women chosen for the study were in different gestation weeks. Medical history and relevant information were recorded. Samples were examined serologically by Enzyme Linked Immunosorbent Assay (ELISA) to measure the titer of immunoglobulin G (IgG) against Cytomegalovirus. One hundred and seventy two (95.6%) of samples were positive for the Cytomegalovirus, with titers range between 1.6-58.17 IU/ml.

Conclusion: CMV was found to be quite common in this area. 20% of CMV positive women suffer from complications such as abortions, defected babies etc., and this probably due the infection with CMV.

Key words: Cytomegalovirus, pregnant, women, infection and gestation.

Introduction

The term Cytomegalo means a cell of great size and describes the appearance of cells infected with this herpes virus. Cytomegalovirus (CMV) is a member of the family Herpesviridae. CMV is a public health problem which can be a potential killer or lifelong silent companion [1]. Morphologically is very similar to other herpes viruses [1, 2 and 3].

The replication of the CMV occurs in the nucleus. Like all herpes viruses, viral DNA integrates with host cell DNA to establish a latent infection. Therefore, CMV infections result from either primary exposure, or a reactivation of latent virus infection. CMV has been shown to infect abroad spectrum of cells in vivo. For this reason the CMV can be shown in various body organs. However, in the laboratory it is usually grown in human fibroblast cell line [4, 5]. Acute infection usually occurs in immunosuppressed and AIDS patients, and the symptoms vary from mild to severe. The severity of infection

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depend on a number of factors, such as the age of host, his immune status and the stage of pregnancy at the time of acquiring the infection ("congenital") [6.7]. Recently certain antiviral drugs have been used to control the CMV infection and to improve the life expectancy in this group of patients [5, 8]. Studies have shown the latency of CMV inside lymphocytes cause several changes in T-lymphocytes differentiation; this will increase the rate of infectious diseases and the rate of death among aged patients [8]. The virus can escape certain defense mechanisms by producing certain proteins, these proteins interfere with the major histocompatibility complex class I proteins and prevent their preparation and introduction to cytotoxic T-lymphocytes and therefore, the CMV infection become difficult to control [5].

CMV infection in pregnancy is extremely serious and considered a major health issue in several parts of the world which requires precautionary measures. Congenital infections are acquired when the developing fetus becomes infected by CMV crossing the placental tissues from a mother who acquired a primary CMV infection during the pregnancy. Some of these congenitally infected infants are born with severe deformities and die shortly after birth [10]. CMV is among the leading congenital causative agents in developed countries [9]. Furthermore, the immunity of the mother does not provide protection against congenital infection but it reduces the severity of symptoms during acute infection [10].

Severe symptoms also seen on unborn fetus and neonatal, but the problem of CMV infections in pregnancy is perceived by scientific community and public health authorities. Consequences of CMV in pregnancy had seen as congenital CMV after primary or recurrent maternal infection. primary infection has occur at 1–4 % for pregnant mother who are 45% of pregnant woman in higher income group and 15% of pregnant women in lower income group, where 40% of them transmit infection to their fetus clinic features just had seen in 10–15% outstanding recurrent maternal infection was 0.15% in the higher income group of pregnant women who were 55% immune. The overall incidence of congenital HCMV varies from 0.24% to 2.2% this percentage includes newborn born to mothers with primary or recurrent infection. There is some difference between countries, where the incidence increased to 5.4% at Sukuta village in Gambia [7].

The virus have multiple mechanisms of immune evasions for HCMV could be related to pathogenic role of the virus include US2, US3, US6, US11, and US16. There are a number of recent assays to prognostic and diagnosis maternal and fetal infection.

In fact, although existing immunity does not prevent transmission of the virus to the fetus, over the last 30 years attempts to develop any HCMV vaccine that have been directed at the five major strategic approaches: live attenuated recombinant virus subunit, peptide and DNA vaccines this program aimed to develop a safe and effective vaccine that reduce incidence of primary infection at pregnant women. In Libya studies concerned with the prevalence of CMV are rare and therefore, this study was undertaken to examine the prevalence of Cytomegalovirus infection in a group of pregnant women attending to Brack General Hospital for consultation and treatment.

Materials and Methods:

One hundred and eighty pregnant women who attended Brack General Hospital for consultation and treatment during the period between July and October 2008 were taken as a study group. Serum samples have been

collected from women at difference gestation weeks, after collecting some information related to patients history were taken, these included age of patient, accommodation , pregnancy period and other medical history information such as abortion , and delivery of newborns with special symptoms such as hepato-splenomegaly, microcephaly, hearing loss , blindness and mental retardation . Then the women were asked if they had taken certain drugs such as Aspirin.

Samples were examined serologically by Enzyme Linked Immuno Sorbent Assay (ELISA) to measure the titer of immunoglobulin G (IgG) against CMV.

Results:

This study was performed on 180 pregnant women aged between 17–43 years, mean = 28.64 years, thirty nine women at the first trimester (22%), thirty six (20%)at the second trimester, and one hundred and five (58 %) at the last trimester of gestation. One hundred and seventy two samples (95.6%) were found positive based on the test criteria (titer more than1.0 unit). With titer ranged between 1.6–58.16U/ml average 21.14 IU. Eight samples) 4.4%) were negative, titer ranged between 0.16-1.05IU/ml average (0.63IU/ml). The prevalence of infection was increased with the age since raised the prevalence from 90.9% at ages between 16 to 20 years to arrive 100% in the age older than 30 years (Table 1). Furthermore, there is no significant variation in the titer in different gestation groups (Table 2).

About thirty women had a medical history of abortion and newborn abnormalities, these congenital abnormalities include microcephaly, hearing loss, hepato-splenomegaly and late hearing loss. According to medical analysis most women did not have history of rubella infection nor toxoplasmosis. 153 pregnant women didn't take Aspirin at gestation.

Discussion

The results of this study have indicated high prevalence of CMV infection in Brack, Al-shati, Libya. The results of this study was similar to results of another studies carried out in countries such as Egypt and Turkey [9, 10]. But it is higher than recent studies at developed and manmade such as Australia. Italy, Japan, high prevalence of infection at previous countries depends on many factors, including family size, social habits, income, at other side, decrease of infection at developed countries refers to medical assurance, health care, and economic development.

Results of this study ensure numerous of women at childbearing have specific antibodies against Cytomegalovirus that give protection against primary infection of Cytomegalovirus, so it decreases risk of infection on fetus in future at the study region, at the same time, high prevalence of community indicate increased Probability of reinfection by new strains or recurrent infection by first strain or other strains at any age.

According to age in this study group the prevalence of CMV infections raised from 92.5% at ages less than 25 years to get 97.3% at ages older than 25 years.

There is no significance difference of HCMV specific IgG titer, neither at difference gestation stages, nor at having Aspirin during gestation. Thirty six pregnant women suffered from abortion problem or delivered babies with different abnormalities, examinations at the time of these problems ensure that they were not suffering from toxoplasmosis nor rubella diseases although they were not examined for CMV at that time we suggest that the CMV could be the reason of these problems as examination for CMV after years

Table 1: Anti-CMV titers among different age groups

Age years	specimens	Positive (%)	Concentration of CMV IgG IU/ml (mean)
16 –20	11	10 (90.9%)	6.73-34.68 (18.46)
21–25	56	52 (92.9%)	4.51-58.17 (21.12)
26–30	56	53 (94.4%)	2.37-42.13 (21.71)
31–35	30	30 (100%)	3.25-39.71 (23.17)
36–40	20	20 (100%)	3.91-39.72 (18.71)
37–45	7	7 (100%)	1.6-33.29 (18.94)
Total	180	172 (95.6%)	1.6-58.17 (21.14)

Table 2: variation of anti-CMV titer with gestation stage

Period of gestation trimester	**Specimens**	**Positive (%)**	**Concentration of CMV IgG IU/ml (mean)**
First	39	37 (95%)	2.37-44.54 (22.05)
Second	36	35 (97%)	3.25-39.71 (23.43)
Third	105	100 (95%)	1.6-58.17 (19.99)
Total	180	172 (95%)	1.6 58.17 (21.14)

of these problems revealed titer of CMV specific IgG ranged between 2.37 to 39.32, IU/ml. commonly a titer of CMV antibodies are mild high at most seropositive pregnant.

In conclusion: CMV is quite common in this area. 20% of CMV positive women suffer from complications such as abortions, defected babies etc., and this probably due the infection with CMV.

References:

1. **Revello MG and Gerna G (2002).** Diagnosis management of human Cytomegalovirus infection in mother, fetus and newborn infant. *Clinical Microbiology Reviews*. 15(5): 680-715
2. **Robbins SL and Kumar V (1987) .**basic pathology. 4 ed . Saunders USA.
3. **Levinson W (2006).** Review of medical Microbiology 9 ed. The McGraw-Hill Companies. USA.
4. **Harvey RA, Champe RC, Fisher BD. (2007).** Microbiology Lippincott's illustrated reviews .2 ed. Lippincott Williams and wilkins .USA.
5. **Sokal EM, Veyekemans F, Goyet J, Moulin D, Hoorebeeck NV, Alberti D, Bust JP, Rahier J, obbergh LV, clapuyt P, carlier P, carlier M, claus D, latinne D, hemptinne B, Botte J (1990) .** Liver transplantation in children less than I year of age. *The Journal of Pediatrics*. 117(2): 207-219.
6. **Sprctor SA, Hisa K, Crager M, pilcher Mcabral S, Stempien MJ (1999).** Cytomegalovirus CMV DNA load is an independent predictor of CMV disease and survival in advanced AIDS. *Journal of Virology*. 73(8): 7027-7030.
7. **Van der sande MA, Kaye S, Miles DJC, Waight P, Jeffries DJ, and Ojuola (2007).** Risk factor for clinical outcome of congenital cytomegalovirus infection in a peri-Urban West Africa birth cohort. *PLOS ONE*. 2(6): e492.
8. **Sutherland CL,Chalupny NJ. Cosman D. (2001).** The UL-16 binding proteins A novel family of MHC class I related ligands for NKG2D. Activate

natural killer cell function. *Immunology*. 181: 185-192.

9. **El-nawawy A, Soliman AT, El-azzouni O, Amer E, karim MA, Demian S, El-sayed M (1996).** Maternal and neonatal prevalence of Toxoplasma and Cytomegalovirus antibodies and hepatitis B anting in Egyptian rural area. *Journal of Tropical Pediatrics*. 42(3): 154-157.
10. **Hirota K, muraquchi K, Watabe N, Okumure M, kozu M, Tokahashi K, Machida Y, funayama Y, oshima T, Numazaki Y (1992).** Prospective study on maternal intrauterine and prenatal infection with Cytomegalovirus in Japan during 1976-1990. *Journal of Medical Virology*. 37(4):303-306.