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Study of Prevalence and Some Immunological Characteristics of Cytomegalovirus Infections among Pregnant Women

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Cytomegalovirus1(CMV)i is one of the essential causes o of intrauterine contagions. The contagion is commonly asymptomatic in immunocompotent adults, but its import in various times elevated when it happens throughout pregnancy. Pregnant women with CMV i infection can be responsible for abortion or congenital malformation. This subject was aimed to estimate the prevalence of cytomegalovirus virus amid pregnant women in Babylon province and evaluation of some haematological and immunological parameters in women infected with CMV. The study was conducted on (145) pregnant women referred to the Babylon Teaching Hospital for Maternity and Children to investigate the prevalence of Cytomegalovirus in Babylon province. Overall of (145) pregnant women was contained in this study, CMV specific IgM and IgG antibody were detected by minividas-test. Blood hemoglobin (Hb) concentration, neutrophil and lymphocyte accounts were determinate. Single radial immune diffusion plates were used for assessment of C3 and C41 level in infected women. Among 145 pregnant women were evaluated for CMV, (95.1%) were positive toward I IgG and (4.1%) were positive toward I IgM. Most of CMV infections among women with age ranging between 20-29 years. It was found that there was a increase in the lymphocyte count and complement components C3 and decrease in the C4 level among CMV patients compared to control group, while haemoglobin and neutrophile level appeared normal. This study summarized that there are increasing seropositivity rate for r human cytomegalovirus amid pregnant women The prevalence of CMV was relatively high in our locality.

Keywords: CMV, IgM, IgG. Pregnant women, Babylon.

Pregnancy leads to temporary immune inhibition, that may be causing increase exposure of pregnant women to infection[1]. Several viral infections are correlated with essential maternal and fetal sequels if get throughout pregnancy and causes abortion, the most commonly encountered infections is Cytomegalovirus (CMV) infections[2]. CMV is endemic all over the world. It's part of Herpesviridae family that infects human. It is also called as human herpesvirus 5 (HHV5). is can be transfer via saliva, , breast milk, placenta, breast feeding, sexual contact blood transfer and organ transplantation[3,4,5].

HCMV infection may be a symptomatic, or may include mononucleosis like symptoms with prolonged fever and mild hepatitis[1]. CMV is t the most frequent causes o of congenital infection. A primitive infections happen in 0.15 to 2.0% of whole pregnancies and causing many risk to the fetuses of f pregnant women1. The transferee of CMV 1 can happen throughout primary 1maternal infection 1or during non-primary infection (revive and reinfection)) of seropositive mothers, but t the transfer rate to the fetus is a lot of higher for r non-

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immune mothers (up to1 40%) than for immune mothers (0 to.1%)[6]. Monocyte/macrophages and endothelial cells are considered places of CMVsurvival, latency and reproduction and its important in maintaining life-long infection[7]. CMV (infection in non)-immunocompromised individuals can -shift of immune-response during) pregnancy from Th2 to-Th1 and apoptosis which can be seen clinically as an abortion developed[9].

CMV /infection of immunocompetent persons induce a humoral0immune response and the consequent production of stable-levels of anti-1CMV IgG antibodies[10]. A preceding researches have proved that1the cellular immune) response to$_1$ CMV is of essential interest in eradicating the virus from the host1in a murine model. CD8_1T lymphocytes are considered to be an vital host) defense against-viruses[11].

MATERIAL AND METHODS

Samples collection

This study was done on pregnant women aged between (10-50) years who attending0to the Babylon Teaching Hospital for-Maternity and l Children in Babylon province during the period of one year (2017). Five ml of blood samples were collected from pregnant women and immunocompetent nonpregnant women as control and then divided into two tubes, 3ml of blood put in plain tubes for separation of serum and the remain 2ml of blood put in EDTA tube for hematological test. Sera was used for the detection of antibodies (IgG and IgM) specific to CMV using a minividas test (kits/ BioCheck-USA).

For hematological test, anticoagulated blood samples in EDTA tube)were used to determine concentration of blood hemoglobin (Hb). and percentage of neutrophile and lymphocyte[12,13].

Complement components C3 and C4 level were determined in patients and control group by using single radial immune diffusion. Five µl of serum sample or control were applied. The lid was closed firmly, incubated at room temperature 25 ºC and the diameter was measured accurately[14].

Statistical analysis

Data have been analyzed statistically using SPSS program version 11. Analysis of quantitative data was done using t-test

RESULTS AND DISCUSSION

Seroprevalence of CMV

This study was carried out on pregnant women to examine the seropositivity rates of IgG-and IgM1 specific to CMV. The results of this study showed that among 140 tested pregnant women, (4.1%%) were positive for IgM antibodies, (95.1%%) were positive for IgG and (2%) were positive for both IgM-and IgG (Table 1). The results of current study was close to other studies like[9,3] who found that IgG was detected in (90.2%) and (97.5%) and IgM in (9.18 %) and (6.0%) of pregnant women respectively.

Variable IgM-positivity were recorded worldwide, only 1% in Turkey1, 2.5% in Iran, 2.5 in Western Sudan and 1.7% in Korea[3]. Positive IgM results to) Cytomegalovirus (CMV) are indicated of a primitive or repeated infection. IgM (antibodies to CMV can continue for (2 to 9)months after the initial infection. Not all patients with reactivated CMV infection will) have noticeable levels of IgM antibodies[15].

The seroprevalance of-CMV IgG detected in this7study was similar-to the findings-reported by[16,17]. The higher percentage of CMV-IgG seropositivity are indicative of past (CMV) infection, specifically when they were IgM)-negative, these women1as mentioned can cassumed immune and their primary infection with CMV was) consider to have been happen before the present pregnancy and they were mostly asymptomatic1personnel[15,18].

In this study CMV is endemic in our population. The high prevalence proved that CMV is simply transmitted than a some other i infections like as measles. Specific)care and appropriate vaccination program are needed to prevent the transmission of CMV[19].

The results of the present study showed that highest seropositivity rate of CMV 5(55.5%%) was seen among age group 20-30 years, while others age groups showed percentage of 3(33.3%) for age group 10-20 and (11.1%) for age group 30-40 years (Table 2). These results were confirmed by (20, 21,19) who stated that most CMV infections seen among age group 20-30- years. Age group 20-30 was determined as the major age group for

the occurrence of CMV primary infections and this may be due to that most marriages in our population occurred among the this age group.

In Iraq, Our study has shown that the common of women of gestation age are seropositive for CMV and that they deal with the infection either through prenatal or postnatal transmission or during early childhood.

Estimation of Immunological and hematological parameters

Concerning the serum complement components level in CMV patients . It was found that there are increase in the levels of C3 (204.40 ±20.33) in patient group compared to control group (105.03 ±10.84) and decrease in the level of C4 (10.52± 3.47) among patients group compared to control group (35.92 ±6.77) as shown in (Table 3,4).

The complement0system is increasingly observed as a mediator-of defense or i pathology in a numerous of viral) infections. The antiviral mechanism for complement is frequently illustrated by that the antibodies detecting viral antigens) on the infected cell surface or virion -envelope, and this would in return promote complement activation in cascades which accumulate the complement complex) leading to membrane distraction, known as (CDC) or virolysis. In addition, complement-improve neutralization without virolysis has been designated, and one suggested mechanism for this is that the gathering of complement on viral envelop would prevent viral interplay with its cellular receptor needed for viral passage[22].

The hematological parameters showed that hemoglobin(Hb) concentration and neutrophil count in CMV patients were (13.0233) and (75.2300) in comparison with control group (12.8733) and (74.2800) respectively with no differences between them (Table 5). Similar findings recorded by (9) who found that CMV s seropositivity have no1significant 1effect on some blood parameters included Hb concentration,

Table 1. The seroprevalence rate of anti-CMV IgM) and IgG antibodies among pregnant women

No. of tested women	CMV IgG		CMV IgM		CMV IgM and IgG	
	No. of +ve	% of +ve	No. of +ve	% of +ve	No. of +ve	% of +ve
145	6	4.1%	138	95.1%	3	2%

Table 2. Distribution of infected women with CMV according to age

Age group/ Year	No. of +ve patients with CMV	% of +ve patients with CMV
10-20	1	11.1%
20-30	5	55.5%
30-40	3	33.3%
40-50	0	0

While[23] reported significant decrease for hemoglobin Hb and neutrophil count among CMV patients. CMV is intracellular virus could be localized in leukocytes and is concentrated in neutrophil fraction of the buffy coat[24].

The results of present study revealed increase in the levels of lymphocyte in CMV patients (41.9967) in comparison to control group (22.6867). Our results were in-parallel with others

Table 3. Mean concentration of C3 in patients and control sera (mg/dl)

Group	No.	CMV + C3		
		Means	std	Std. error
Patients	30	204.4000	20.33000	3.71173
Control	15	105.0333	10.84341	2.79976

Table 4. Mean concentration of C4 in patients and control sera (mg/dl)

Group	No.	CMV + C3		
		Means	std	Std. error
Patients	30	10.5200	3.47150	.63381
Control	15	35.9267	6.77184	1.74848

Table 5. Haematological parameters in CMV patients

Group S	No.	Hematological parameters								
		Hemoglobin(g/dl)			neutrophil (%)			lymphocyte (%)		
		Meann	Std.	Std. error	Mean	Std	Std. error	Mean	Std	Std. error
Patients	30	13.0233	1.20650	.22028	75.2300	3.08032	.56239	41.9967	6.65290	1.21465
Control	15	12.8733	1.23315	.31840	74.2800	2.88499	.74490	22.6867	1.49564	.38617

observations recorded by others researchers, who noticed elevated level of lymphocyte in CMV patients[23,25]. In Contrast, The authors[9] stated that patients with CMV has normal level of lymphocyte.

Primary HCMV infection is characterized by an intense viral replication and a profound T-cell response that may last for several months, with both CD8+ cytotoxic and CD4+ helper T-cells playing central roles in the resolution of acute primary infection and the maintenance of long-term memory during viral persistence. HCMV-specific cytotoxicity is predominantly performed by (CDi8+ T-)cells, although HCMV-specific

CD4+ (Ti-cells) also have the ability to lyse infected target cell[26], as well as maintain the upkeep of the CD8+ T-cell population. The virus is also capable of periodic reactivation causing large-scale expansions of cytotoxic T-cells that seem to linger long after the infection has been curtailed. Consequently, people with a latent HCMV infection have substantially increased numbers and proportions of CD8+ (and to some extent CD4+) T-cells[27].

CONCLUSION

This study concluded that CMV infection is common among pregnant women in our local population and this high seroprevalence reflect the low hygienic standards and low community education . Also the many ways of viral transmission have the role in spreading the viral infection, Missing of effective viral treatment play an major role in the transference of the virus from mother t to fetus and cause either abortion or congenital malformations. Hence periodically screening of women of child bearing i age for CMV -infection is wanted in order to decrease the fatal consequence of the pregnancy appearing due to the CMVi infection

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