

Study of Bacterial Infections Associated with Infection with Cytomegalovirus in Anbar Governorate

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Abstract

Human cytomegalovirus (HCMV) is the largest type of herpes virus DNA virus, called the CMV because it amplifies infected cells as it reproduces gradually inside those cells. The study included collecting 110 blood samples for sick women and we visited Al-Ramadi Teaching Hospital with ear, nose, tonsils and eye swabs. Also urine samples were taken, the media of Blood Agar and MacConkey Agar were grown with smears and swabs. The findings of the current study showed that 89 women out of a total of 110 were infected with CMV virus at a rate of 80.6% by virus-specific IgG antibody, which is proof that the infection is old while 21 women were not infected by a 19% percentage of CMV virus due to the absence of IgG and IgM antibodies. Results showed that 78 were positive for bacterial infection among the 89 women living with CMV, 87.6%, while 11 among 21 women without CMV were positive for bacterial infection. The 87.6% proportion of bacterial infections associated with virus infection is high as compared to the 52.3% ratio of people without this virus, and this suggests the growing role of infection in the system. The study findings also found that the highest incidence of CMV virus infection was 82.3% in the age group of infected women (21-30 years) and that the highest incidence of CMV virus infection was 92.6% in pregnant women who had no abortion, while the lowest rate of CMV infection was women who had three miscarriages, 46%.

Keywords: CMV virus, IgG, IgM, bacterial infection.

Introduction

Human cytomegalovirus (HCMV) is a member of the Herpesviridaceae family's Beta herpes virus family, and is the widely pathogenic agent of the vast majority of the world's population. It is called CMV as it amplifies infected cells because it slowly multiplies inside these cells. [1] CMV infection is fairly common but does not spread easily or through unintended communication methods and transport involves direct contact with the infected person's body fluids, where people become infected with the virus by kissing, breastfeeding, physical intercourse, blood transfusion, drug use, organ transplantation and bone marrow. The virus may remain in body fluids for several months and sporadically

throughout life, especially in people suffering from immune deficiency, especially those with AIDS [2].

Bacterial infections associated with CMV infection.

Escherichia coli is known to be a negative bacillus of the Gram stain and one of the most common members of the intestinal family, where it settles in the intestine of humans and animals with hot blood. This is a sympathetic bacterium where it can naturally reside and settle in the intestine as it is known to be a non-pathogenic bacteria and is capable of producing vitamins throughout the integer such as vitamin K2 [3].

(*Proteus mirabilis*) It is a Gram Stain negative bacillus, which belongs to the Enterobacteracea family, as it is considered to be one of the most important types prevalent in hospitals where infection of this bacterial type can occur alone or in conjunction with other

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bacterial species [4].

(Pseudomonas aeruginosa) One of the most common bacterial species in human pathogenic events is opportunistic, especially when the efficacy of the immune system decreases in patients with certain chronic diseases such as cystic fibrosis and AIDS, as well as in patients with cancer and those with burns [5]

(Staphylococcus epidermidis) is considered to be one of the important types from a clinical point of view because it is found in the mucous membranes and on the skin, and these bacteria are opportunistic because of their ability to break the skin’s epithelial barrier, which contributes to many serious diseases causing them. Bacteria cause infection in hospitals[6]. This Study aimed to Determine the presence of CMV virus in the serum of women testing, as well as bacterial infections that may be associated with this virus.

Materials and Methods

110 samples of blood were obtained for sick women, we visited the Ramadi Teaching Hospital for Women and Children and a number of medical laboratories and ages ranging from 20 to 50 years to examine the existence of CMV for the period from 01/10/2019 to 1/2/2020 from 5

ml of venous blood and placed in special Gel tubes, Then the blood was separated by centrifuge (3000 r / min) for a period of 5 minutes to obtain serum for the initial detection of the presence of IgG and IgM antibodies by the Rapid Test Kit, then the serum was stored at -20 °C before ELISA finalized its analysis. Samples were also taken from the same women who underwent a screening test for the CMV virus that included samples of Ear, Nose, Tonsil and Eye using Cotton Swabs and Urine. The samples of Swabs and Urine were cultured using Streaking method on the media of Blood Agar and MacConkey Agar. The dishes were incubated 24-48 hours at 37 °C.

Results and Discussion

CMV Antibody Detection Results :

The results of early detection using the Rapid Test Kit for the detection of antibodies IgG in the blood serum of the women under study, taking into account the values of the antibodies fixed in Table 1 , showed that there were no significant differences at the probability level $P \leq 0.05$, Between the standard levels established in the rapid examination kit and what you get in the current study.

Table (1) Shows the Values of Type IgG Antibody Obtained from Blood Samples

Antibody Type	Antibody Values Standard	Antibody Values Under Study	Number	Percentage
IgG +	1.1<	1.201 – 1.991	66	74 %
		2.000 – 2.932	23	26%
IgG -	0.9 > 0.9-1.1	0.101 – 0.869	5	24%
		0.903 – 1.176	16	76%
IgM -	0.9 >	0.040 – 0.798	110	100%
Pearson Chi-Square 172.409				

Where the results the presence of the antibody type IgG in 64 blood samples from a total of 110 at a rate of 58.1% for the women under study and at certain ages and levels where the presence of IgG is evidence that the

infection is old with this virus, While 46 blood samples, the remaining 41.8%, showed a negative result of the presence of this type of antibody with the same rapid examination. While not all samples showed the presence

of the antibody type IgM, which indicates that the infection is recent. The Results of the ELISA test on the blood serum of all the women under study showed the presence of the IgG antibody in 25 other blood samples belonging to women other than the 64 samples within the rapid examination, bringing the number of positive samples to the presence of this virus to 89 samples, so the percentage will increase to 80.9%, While IgM also did not appear in the serum of these samples. Thus, we infer that the detection of the presence of the antibody IgG is not a final diagnosis of this virus when an early primary detection using a Rapid Test Kit so that all infections The women under study are outdated due to the lack of an IgM. This is because IgM antibodies disappear from the blood after infection, because when the sample is taken, the affected person may be in the

chronic, rather than acute, acute phase [7:8].

Results of Bacterial Infection Associated With the Presence of CMV Virus

The results showed in Table 2 that among 110 women were 89 carriers of the virus, of which 78 were positive for bacterial infection as a positive sign for laboratory implantation of the samples and areas by a percentage of 87.6%, and that the remaining 11 samples were negative for bacterial infection by a percentage 12.3%. While 21 of the women were not infected with CMV virus, of them 11 samples for women were positive for bacterial infection in terms of laboratory implantation and the remaining 10 samples were free of any occurrence of the bacterial infection.

Table 2 Results of Bacterial Infections of Samples of Women Infected With CMV Virus

Type of Injury	The Number of Samples Under Study	As A Result of Bacterial Infection			
		Positively Injured	%	Negatively Injured	%
The Presence of CMV	89	78	87.6	11	12.3
Lack of CMV	21	11	52.3	10	47.6
Total	110	89	80.9	21	19
Pearson Chi – Square 13.676					

Through these results, it was found that the percentage of bacterial infections present in women with CMV virus, which is 87.6%, is much higher than the percentage 52% for women without CMV virus, which may be an indication that infection with CMV virus has a role in causing bacterial infections, and with a high moral difference when The probability level $P \leq 0.05$.

Bacterial Infection Distribution among Women With and Without CMV Virus

The results in Table 3 showed the bacterial species that were diagnosed in the current study through Biochemical Tests as well as through its diagnosis in the Vitek Compact 2 System Diagnosis, that there were no significant differences at the probability level $P \leq 0.05$. Table 3 shows the bacterial species obtained during the current study

that the bacterial type *E. coli* that causes UTI is the most frequent among the bacterial species in the presence or absence of the CMV virus, where the number of bacterial isolates reached 35 isolates distributed between 30 Isolation in the absence of CMV virus 43.4% and 5 Isolation in the absence of CMV virus 7.3% .

Table (3) Number and Types of Bacterial Isolates in Women With and Without CMV Virus

Source of Samples	No	Bacterial Isolates	The Presence of CMV		Lack of CMV	
			No.	%	No.	%
Urine	69	<i>E. coli</i>	30	43.4 %	5	7.5 %
		<i>Aeromonas salmonicida</i>	4	5.7 %	1	1.4 %
		<i>Proteus mirabilis</i>	8	11.5 %	3	4.3%
		<i>Sphingomonas paucimobilis</i>	7	10 %	0	0 %
Tonsillitis	12	<i>Pseudomonas aeruginosa</i>	8	67 %	1	8 %
Nose	10	<i>Stenotrophomonas maltophilia</i>	7	70 %	1	10 %
Ear	15	<i>Staphylococcus epidermidis</i>	12	80 %	0	0 %
Eye	4	<i>Staphylococcus auricularis</i>	2	50 %	0	0 %
Total	110		78	71 %	11	10%
Pearson Chi-Square 5.623						

The result of the current study was close to the study conducted by the researcher [8] in Egypt, where the percentage of *E. coli* bacteria 53.85% . As the difference in the percentage of isolated bacteria is due to the difference in health and geographic conditions and the number of samples used in the study as well as taking antibiotics before taking the sample [9]

Isolated *Proteus mirabilis* bacteria came from women who suffer from urinary tract infection with 8 isolates 11.5% in women with CMV virus and one 4.3% in women without CMV virus. This result was identical to the result of the study conducted by¹⁰, where the isolation rate of these bacteria from the urinary tract was 11.8% .

Distribution of the presence of Antibodies in Women With CMV Virus by Age Group.

Table 4 shows the relationship between the age group of the women under study with infection with CMV virus. The ages of the affected women ranged between three age groups with no significant differences at the probability level $P \leq 0.05$. The results of the current study showed that the incidence of CMV virus was the highest among women whose ages ranged from 21-30 years, with the number of infections amounting to 42 women in terms of the presence of the antibody type IgG and at a rate of 82.3% of the total number of women 51 A woman. It was followed by the age group of 31-40 years with the number of injuries amounting to 32 infected women and by 83% of the total 39 women. While the age group of 41-50 years recorded the lowest number of women infected with this virus, as it recorded 15 infected women, at a rate of 75% of the total 20 women. This difference in numbers and proportions with respect to the age group 41-50 may be due to their

possible exposure to previous infections with this virus and the generation of an immune response to them, This corresponds to the study conducted by the researcher¹¹ in Kirkuk, as it found that the prevalence of IgG antibody prevalence with age, and this does not correspond to the study conducted by ¹³where they found that the prevalence of IgG antibody Increases with age .

Table 4 Distribution of the presence of IgG and IgM Antibodies by Age Group

Age (Year)	No. of patients	CMV - IgG				CMV-IgM	
		IgG +	%	IgG -	%	IgM -	%
21 -30	51	42	82.3	9	17.6	51	100
31 – 40	39	32	82	7	18	39	100
41 – 50	20	15	75	5	25	20	100
Total	110	89	81	21	19	110	110
Pearson Chi- Square .554							

Distribution of the presence of Antibodies in Women With CMV Virus According to the Number of Miscarriages

The Results of the current study shown in Table 5 showed a high incidence of CMV virus in terms of the presence of IgG antibody in the serum of women who did not have a projection case with a significant difference at the probability level $P \leq 0.05$. Where they were 41 women, of which 38 were women with the IgG antibody at a rate of 92.6% and the women who had one single abortion were 34 women of which 30 had the IgG antibody at a rate of 88.2%, and the women who had two abortions were 22 women of which 15 The antibody contained IgG type at a rate of 68%, while the women who had three cases of miscarriage were 13 women of which 6 were six. The antibody contained the type IgG and by 46% the lower percentage of the infection in women who had more than one miscarriage was attributable to their previous injuries. Virus, which made them more resistant to infection with CMV virus. This is consistent with a study in Libya¹⁴ where they found that the prevalence of IgG antibody in women with repeated miscarriage was 75%.

Table 5 The Distribution of the presence of IgG and IgM Antibodies According to the Number of Miscarriages .

No. of Miscarriage	No. of patients	CMV – IgG				CMV-IgM	
		IgG +	%	IgG -	%	IgM -	%
0	41	38	92.6	3	7.4	41	100
1	34	30	88.2	4	11.8	34	100
2	22	15	68	7	32	22	100
3	13	6	46	7	54	13	110
Total	110	89	81	21	19	110	100
Pearson Chi- Square 17.334							

Infection with CMV is one of the most important causes of miscarriage, premature birth and congenital malformations¹²

Conclusion

Through the results of the current study, we conclude that the percentage of bacterial infections present in women with CMV virus, which is 87.6%, far exceeds the percentage of 52% for women without CMV virus, which may be an indication that infection with CMV virus has a role in causing bacterial infections, and with a significant moral difference at the level of probability $P < 0.05$.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

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