ORIGINAL ARTICLE

The study of Seroprevalence of CMV antibody in hemodialysis patients referred to Shahid Beheshti hospital of Babol in 2012

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ABSTRACT

Cytomegalovirus (CMV), of Herps viruses' family, is considered as endemic for most parts of the world. For limb or blood receivers and those who suffer from immune deficiency, CMV is a defined factor in death rate increase among such patients. Immune system suppressing drugs, old age, kidneys malfunction, blood transfer (even clotting factor), receiving limbs from the infected people, hemodialysis and the number of that during the week (1) are considered as risk factors for the infection made by CMV. Getting the required permissions, a list of non-emergent patients in hemodialysis ward of Shahid Beheshti Hospital in Babol was made. Getting informed of the first appointment, a questionnaire was filled out for the patients. 2 ml of blood without anti clotting was taken from each patient in order to check the IgM and IgG antibodies and anti CMV. Checking for the existence of antibody in the serum was done by means of RADIM kit and ELISA method. The results for optical density are considered negative for those less than 0.9, positive for those more than 1.1 and boarderline for those between 0.9 and 1.1. This is a study on 188 non-emergent patients under treatment of chronic hemodialysis admitted to hemodialysis ward of Shahid Beheshti Hospital in Babol. The average age of the patients was 57.1±17.3 years and the range was between 20 and 88. The average treatment time was 40.6±41.8 months. The abundance of IgM antibody was studied and it was negative for 140 people (74.5%), borderline for 9 people (4.8%) and positive for 39 people (20.7%). The same study was done for IgG antibody which was negative for 101 people (53.7%), borderline for 23 people (12.2%) and positive for 64 people (34%). Regarding the low abundance of IgG antibody in this study compared with other studies and the lack of relation between sex, age, dialysis duration and the number of treatments during a week, it seems that individual and social hygienic condition and other effective factors in the group under studying (patients under treatment of chronic hemodialysis admitted to hemo dialysis ward of Shahid Beheshti Hospital in Babol) were high. Also high abundance of IgM antibody in this study compared with other studies, may lead to different problems like getting infected by new CMV.
Keywords: Hemodialysis, cytomegalovirus and antibody.

INTRODUCTION

The cytomegalovirus (CMV) is from the herpes family of viruses and it is considered to be endemic in all regions of the world. CMV infection is very common and usually asymptomatic. Infection by this virus has spread worldwide, whereas 40% to 90% of adults are suffering from hidden infection. In recipients of blood or organ transplants, especially in immunocompromised patients, the CMV is an unknown factor in increasing the death of these patients [1]. Typical symptoms of this infection in transplant recipients are different from the clinical signs of acute CMV disease to injury to the organ and failure or rejection of that organ[2].

CMV infection often occurs within the first two decades of life and it remains hidden in the body due to the low transcription, and eventually activates in a immunosuppression condition. Immunosuppressive drugs, old age, poor renal system function, blood transfusion (even the coagulation factor), receiving organs from infected persons, hemodialysis, and the number of dialysis per week are considered as risk factors for CMV infection[1,3].

ESRD is associated with impairment in cellular and humoral immune system. In ERSD patients, the activation of local stimulation of T-lymphocytes decreases, so the function of memory T-lymphocytes in ESRD are weakened. ESRD patients are susceptible to viral infections and reactivation of old infections [3].

Infected people can transmit the virus to the normal recipients through blood donation. Infection to this virus in persons with normal immune generally do not cause any adverse outcome, while its transmission to immunocompromised patients can lead to serious morbidity and even death [4]. Many studies have shown the presence or increase of snit-CMV antibody in hemodialysis patients. Also, rhetytnit, hepatitis and pneumonia are reported as connected to CMV [1]. The aim of this present study was to determine the prevalence of anti-CMV in patients who are on dialysis in ShahidBeheshti Hospitalin Babol.

METHODS AND MATERIALS
The present study is a cross-sectional descriptive study. After obtaining the necessary permissions from the hemodialysis department of the ShahidBeheshti Hospital, the list of non-emergency patients to the department were admitted and after appointing a time to visit the patients, they completed the questionnaires. 2ml blood was extracted from patients without any anticoagulant material in order to investigate the IgM and IgG antibodies anti-CMV. The study of the presence of antibody in serum was performed by Elisa method using the RADIM kit. The results in the optical density were considered less than 0.9 ISR negative, and more than 1.1 ISR positive and in the borderline between 0.9 and 1.1 ISR.
The T-test and MANN-WHITNEY test and SPSS software were used in order to investigate the relationship between variables and there was a significant border on $p<0.05$ in both cases.

FINDINGS
This study was conducted on 188 non-emergency patients on chronic hemodialysis referred to ShahidBeheshti Hospital in Babol. Of these patients, 102 persons (54.2%) were male and 86 persons (45.8%) were female (figure 1).

Figure 1: The gender of patients.
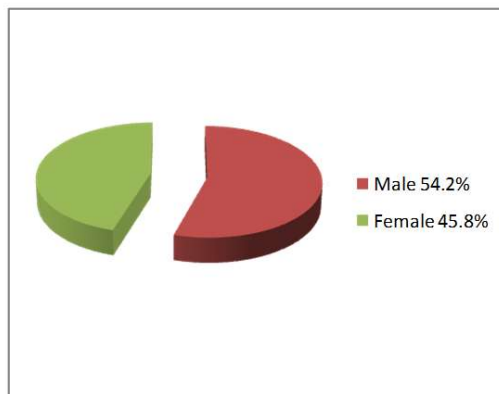
The average age of patients was 17.3±57.1 years and aged between 20 to 88 years old.
The average hemodialysis treatment time of patients was 40.6±41.8 months.
In the study of the prevalence of anti-CMV Igm antibody, 140 patients (74.5%) were negative, 9 patients (4.8%) were intermediate and 39 patients (20.7%) were positive. Also, in this study for IgG antibody, 101 patients (53.7%) were negative, 23 patients (12.2%) were intermediate and 64 patients (34.4%) were positive.
The average amount of anti-CMV IgM antibody in collected samples was 0.74±0.87 which was 0.8±0.9 among male patients and 0.56±0.84 among female patients (table 1).
The average amount of anti-CMV IgG antibody in collected samples was 0.51±0.98 which was 0.48±0.95 among male patients and 0.55±1.06 among female patients (table 1).
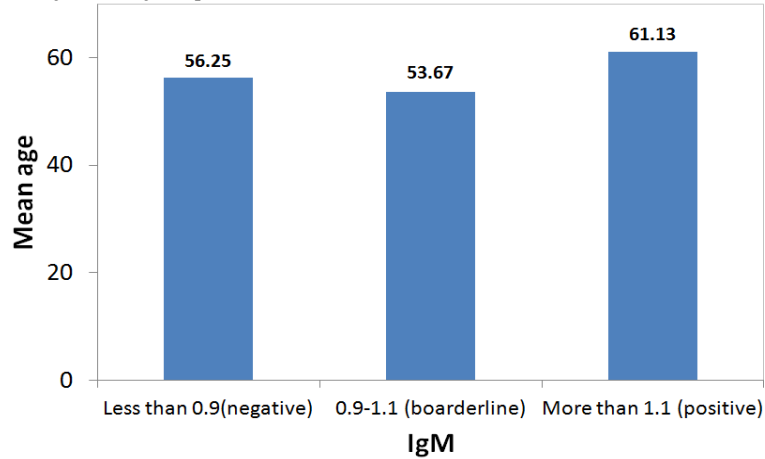
Table 1: The average amount of anti-CMV IgM and IgG antibodies in collected samples.

| Variables	Male	Female	Total population
IgM	0.9 ± 0.8	0.84 ± 0.56	0.87 ± 0.74
IgG	0.95 ± 0.48	1.06 ± 0.55	0.98 ± 0.51

In a statistical survey conducted among sex and prevalence of positive, intermediate and negative persons regarding the anti-CMV IgM and IgG antibodies, no significant relationship was found (p>0.05).
The average age of patients under study for anti-CMV IgG antibody was 18.34±58.84 years in positive group, 13.62±60.52 years in intermediate group and 17.47±55.29 years in negative group. No significant correlation was found between the age and the amount of anti-CMV IgG antibody (p>0.05).

The average age of patients under study for anti-CMV IgM antibody was 18.46±61.13 years in positive group, 18.74±53.67 years in intermediate group and 16.94±56.25years in negative group. No significant correlation was found between the age and the amount of anti-CMV IgM antibody (p>0.05).

Also, no significant correlation was found between the hemodialysis treatment time and the amount of anti-CMV IgM and IgG antibodies among patients (p>0.05).

Figure 2 to 5 shows the comparison of the average age, hemodialysis treatment times and amount of anti-CMV IgM and IgG antibody in dialysis patients in Babol district.
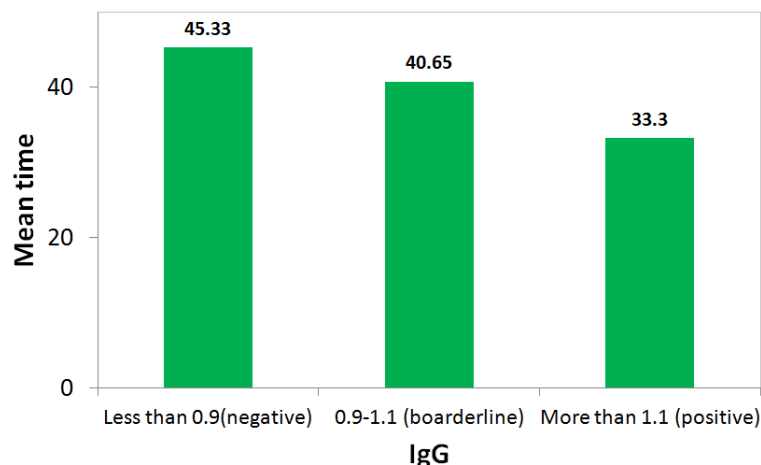

Figure 2: The comparison of the average age and amount of anti-CMV IgM antibody in dialysis patients in Babol district.
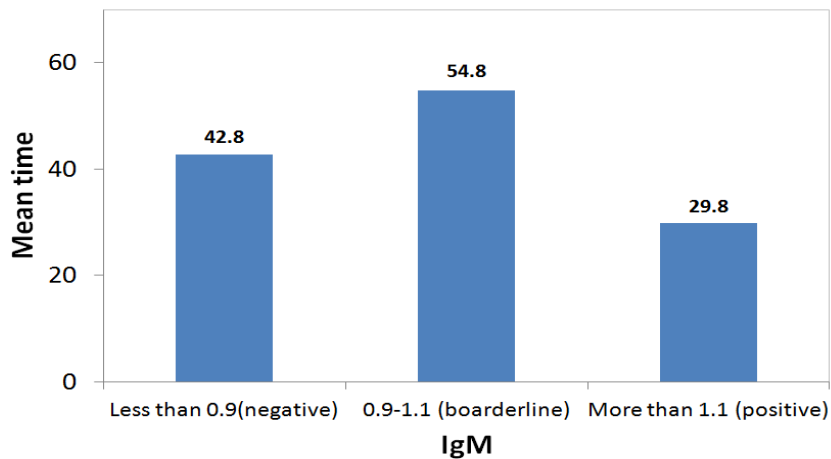
Figure 3: The comparison of the hemodialysis treatment times and the amount of anti-CMV IgM antibody in dialysis patients in Babol district.
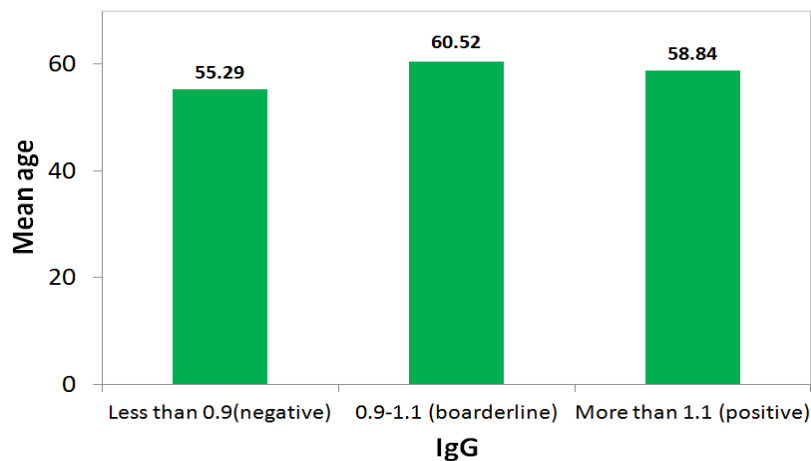

Figure 4: The comparison of the average age and amount of anti-CMV IgG antibody in dialysis patients in Babol district.

Figure 5: The comparison of the hemodialysis treatment times and the amount of anti-CMV IgG antibody in dialysis patients in Babol district.

The number of dialysis for patients per week was divided into 4 groups: once a week, twice a week, three times a week and four times a week which include respectively 1 patient (0.5%), 61 patients (32.4%), 124 patients (66%) and 2 patients (1.1%) (figure 6).
There was no significant correlation between the hemodialysis treatment times per week and the amount of anti-CMV antibodies ($p > 0.05$).
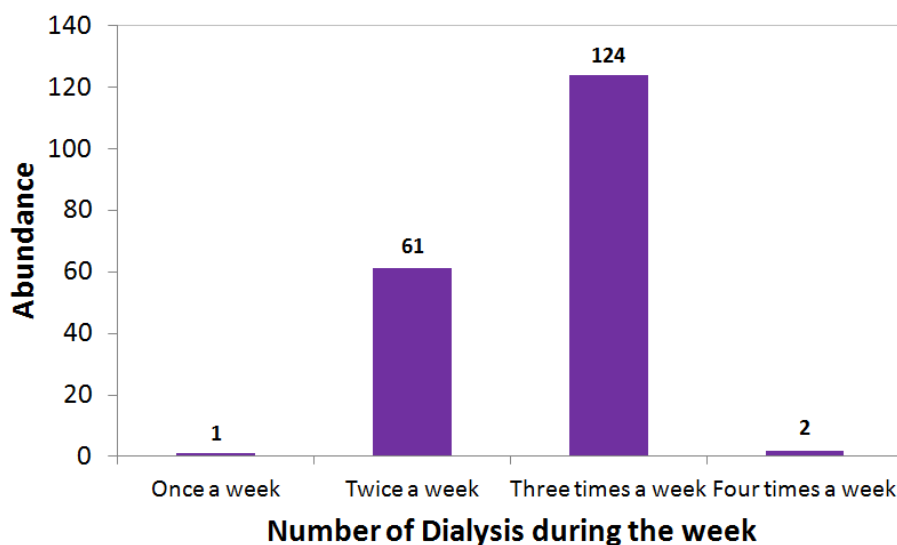
Figure 6: The frequency of dialysis times per week in dialysis patients in Babol district.

DISCUSSION
In the present study, 20.7% of hemodialysis patients referred to hemodialisis department of the Shahid Beheshti Hospital in Babolwere found positive based on anti-CMV IgM antibody and 34.4% were found positive based on anti-CMV IgG antibody.
The prevalence of CMV infection depends on economic, social and public health conditions. The amount of the prevalence of antibody for adults was about 40-80% in developed countries and about 90-100% in developing countries. For example, infection with this virus in India and Malaysia was 81 and 91.8 %, respectively [5].
In the study of Aminzadeh et al. [6]which was in the hemodialysis centre of Labbafinejad Hospital in Tehran in 2002, they pointed that 91% of patients under study were Anti-CMV IgG positive, and also 81.5% were Anti-CMV IgM.
In a survey on the prevalence of anti-CMV specific antibody, Sepehrvand et al. [1]in 2010 reported that the prevalence of IgG in patients under the study was 77.4% and it was also 7.1% for IgM.

By comparing and investigating the above mentioned studies and the present study we can consider some factors such as hygiene, social and economic conditions over time as the main reasons for reducing the prevalence of anti-CMV IgM and IgG antibodies in these studies. Of course, the regional issues and also the differences between dialysis centers for infection controls can not be ignored.

Inserting CMV into body stimulates humoral and cellular immune systems and certainly the cellular immune system has an important role against viruses. Although anti-CMV antibodies can reduce the severity of the disease and immunoglobulins are effective in preventing the disease, but the secondary role of the humoral immune system is shown in the development of CMV infection and disease in the people whose immune system is inhibited, and from the sociological point of view, like transplant or HIV patients [7].

During the early infection time, the IgM reaches to its maximum and during 12-16 weeks it is disappeared after revealing the infection without any clinical sign. IgG reaches to maximum during a month after infection [8].

The results of the present study show that 20.7% of patients under the study were IgM positive and 34% were IgG positive.

If the results of the present study can be compared and analyzed in the future studies on the prevalence of specific antibodies against CMV in healthy people, the relationship between the role of the immune system and active and passive prevalence of CMV in the present society can be better discussed.

In a study conducted in Babol district in order to determine the serum prevalence of antibodies against CMV in dialysis patients in 1998, the serum prevalence of AbIgG was 58.7% and for AbIgM was 10.67%. As can be seen, the serum prevalence of AbIgG was higher and for AbIgM was lower than the present study.

Tarabadi et al. [9] mentioned that the comparison of the prevalence of IgM, specific anti-CMV, in hemodialysis patients and healthy people shows a significant difference. They noted the reduction in immune system activity as one of the reasons for this difference.

Tarabadi et al. [9]did not observe any significant difference in the level of IgG, specific anti-CMV antibody, among hemodialysis patients and healthy people; they see this result due to the broad prevalence of this virus in the society.

The average age of patients under the present study was 17.3±57.1. Also, the average age of patients who were positive for anti-CMV IgG antibody was 18.34±58.84 and for IgM antibody positive was 18.46±61.13.

The findings of this study indicate that there was not any significant relationship between the age and the amount of specific antibodies against CMV.

Pilquett et al. [3], Asadi et al. [10], Aminzadeh et al. [6] and Hardiman et al. [11]reported the similar results.

The average hemodialysis treatment times for patients were 41.8±40.6. The findings of this study indicate that there is no correlation between the hemodialysis treatment times and the amount of anti-CMV specific antibodies.

Aminzadeh et al. [6]studied on 54 patients under hemodialysis with the average treatment time between 69.4±81.7 regarding the anti-CMV IgM and IgG antibodies. They stated that there is no significant relationship between the hemodialysis treatment times and the amount of anti-CMV specific antibodies which is consistent with the results of the present study.

They mentioned that perhaps the main reason is the small sample size of their study (54persons).Whereas, in the present study, with the three times larger sample size (188persons) no significant relationship was found between the hemodialysis treatment times and the amount of anti-CMV specific antibodies.

It seems the influence of the hemodialysis treatment times depends on some factor such as the number of dialysis per week, the level of personal hygiene and economy, society and dialysis centers; these factors can be studied separately.

In the present study on the number of dialysis per week, 98.4% of patients received 2 or 3 times a week, no correlation was found between the number of dialysis per week and the level of anti-CMV specific antibodies.

Aminzadeh et al.[6]also did not find any significant relationship between the number of dialysis per week and the level of anti-CMV specific antibodies.

According to the findings of this study and other studies, the hemodialysis treatment times and the number of dialysis per week had no significant role in the amount and the prevalence of the anti-CMV specific antibodies and perhaps we can see this issue as a reason for the more prominent role of personal hygiene and economic condition and society.

The prevalence of anti-CMV IgM antibody in this study (20.7%) was higher than other studies (except Tarabadyet al.[9]). As mentioned before, the anti-CMV IgM antibody is positive and increases in the active

CMV infection, perhaps the new infection with the new strains could be studied as Tarabady et al. [9]noted this issue in a similar situation.

CONCLUSION
According to the low prevalence of anti-CMV IgG specific antibody rather than other studies and lack of the relationship between age, sex, the dialysis treatment times and the number of dialysis per week with the prevalence of anti-CMV specific antibodies, it seems that the role of personal and social hygiene and effective factors on this issue in the population under this study (patients under chronic hemodialysis at ShahidBeheshti Hospital in Babol district) was high.

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