ORIGINAL ARTICLE

The Seroprevalence of Cytomegalovirus Antibodies among Prospective Blood Donors in Jos

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Abstract

Background: *Human cytomegalovirus, otherwise called human herpes virus type 5, is a significant cause of morbidity and mortality in pregnancy, and among immunocompromised patients like recipients of organ transplants. Cytomegalovirus is transmissible via blood transfusion, among other parenteral routes. This study therefore aims at establishing the seroprevalence of CMV antibodies among prospective blood donors in Jos. This is with a view to making recommendations on donor screening and transfusion protocols among susceptible patients.*

Methods: *A total of 200 prospective blood donors were recruited into the study. Screening for CMV antibodies was done using ELISA kit, manufactured by "DIALAB", Austria (www.dialb.at)*

Results: *Of the 200 prospective blood donors analysed, 184 donors were found to be positive for cytomegalovirus antibodies, representing a prevalence rate of 92%.The peak age prevalence was in the 25-29 years age range, representing 30.4%.Cytomegalovirus prevalence was lowest in the 15-19 years age range and above 50 years(1.6% each).*

Conclusion: *A cytomegalovirus antibody prevalence rate of 92% indicates that screening for CMV should be included in screening algorithm for potentially susceptible recipients of blood and its products. Non infected susceptible persons should be transfused CMV negative or leucocyte depleted blood and blood products.*

Key Words: *Prevalence, Cytomegalovirus, Prospective Blood Donors, Jos*

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INTRODUCTION

Cytomegalovirus is one of the most pathogenic of the Herpes viruses with a correspondingly high morbidity and mortality.[1,2] Although primary infection with this virus is usually asymptomatic in healthy adults, several high risk patients suffer significant morbidity and mortality from CMV infection.[2] These include organ transplant recipients, patients with malignancies(both haematological and non haematological),people living with HIV/AIDS, pregnant women(including their unborn foetuses),neonates and various other immunocompromised patients. CMV has in recent years emerged as the most important cause of congenital infection, leading to psychomotor retardation[2]. Studies from other parts of the world have reported varying prevalence rates among selected groups.[3-8] In the United States for example, CMV affects 0.5-2% of live births each year.[2] The prevalence of CMV infection in apparently healthy blood donors was 92% and 100% in Lagos and Ibadan, Nigeria respectively.[9-10] The prevalence of Cytomegalovirus infection among donors in Delhi is 95%.[11] Cytomegalovirus infection can therefore be said to constitute a major public health concern worldwide.

Cytomegalovirus induced retinitis is the commonest ocular opportunistic infection, and the most common cause of visual loss in people with HIV/AIDS.[3-16] Among post bone marrow transplant patients, CMV induced pneumonitis is the commonest cause of death the incidence ranging from 20 to 40% with a mortality of 80-90%.[10-14]

Transfusion associated CMV (TA-CMV) infection was reported in 13.5 % of 74 infants who received at least one unit of blood from CMV positive donors. Fifty percent of these infants had either serious or fatal infections. None of the 90 infants who received blood from CMV sero-negative donors was infected.[7,15-18]

Available data reflect the patterns of CMV infection in other parts of the World. The absence of comparable data in blood donors based in Jos and its surroundings prompted this study with a view to obtaining an epidemiological basis for the formulation of a safe transfusion policy.

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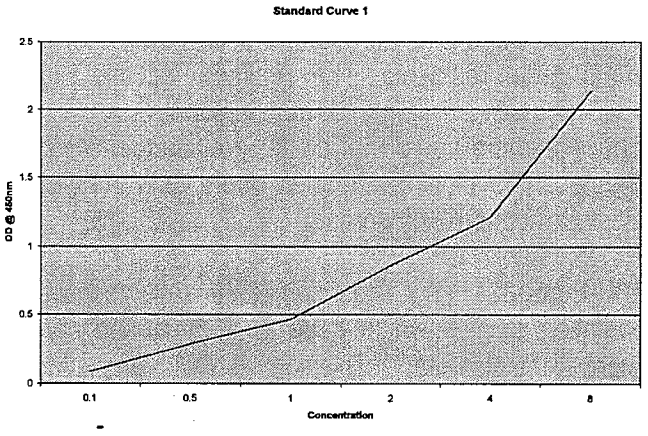
MATERIALS AND METHODS

Two hundred consenting prospective blood donors who reported to the blood bank of the Jos university teaching hospital, (JUTH), Jos; from October 2006 to December 2006 were recruited into the study. Their blood samples were screened for presence of cytomegalovirus antibodies. All tests were done using ELISA-based kits manufactured by "Dialab" Austria (www.dialab.at).

Ethics-normal protocol for the approval of the study by the research and ethical committee of JUTH, Jos was followed. The study is invasive, so informed consent was obtained from all prospective blood donors. The data were analyzed using Epi info computer software version 3.3.2. Simple proportion was used to determine prevalence.

RESULTS

A total of 200 prospective blood donors who presented for bleeding were screened. The age range for the study population was between 19 and 55 years, with a mean of 37 years. The modal age range of the study population was 25-29 years, representing 29% of the study population. (Table 1) One hundred and eighty four donors (92%) were positive for CMV antibodies. (TableII).Figure I shows a standard (calibration) curve, plotted to determine the CMV antibody status of donors. The age distribution of CMV antibody positivity is shown in figure 2. CMV antibody prevalence was highest in the 25-29 years age group (30.4%) and lowest in the extreme age groups (1.6%).



Concentration (in iu/ml)
Standard (calibration curve)
Figure 1

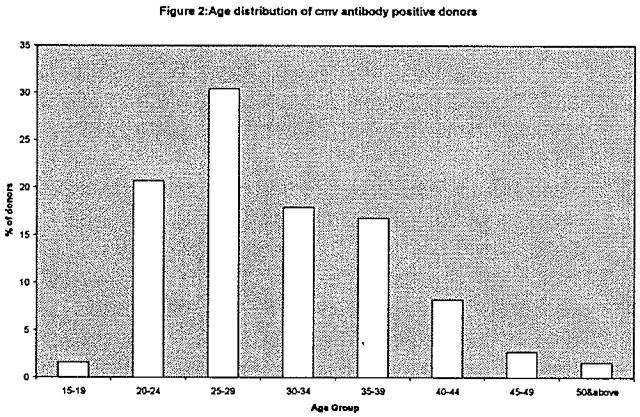


Table I: Age and Sex Distribution Of Donors

AGE (YEARS)	TOTAL		SEX			
			MALE		FEMALE	
	NO	PERCENT	NO	PERCENT	NO	PERCENT
15-19	3	1.5	3	100	0	0.0
20-24	40	20.0	39	97.5	1	2.5
25-29	58	29.0	57	98.3	1	1.7
30-34	37	18.5	37	100	0	0.0
35-39	33	16.5	33	100	0	0.0
40-44	17	8.5	15	88.2	2	11.8
45-49	8	4.0	8	100	0	0.0
50 and Above	4	2.0	4	100	0	0.0
TOTAL	200	100	196	98	4	2.0

TABLE II: SEROPREVALENCE OF CMV ANTIBODY IN JOS

	NUMBER OF SUBJECTS	PERCENTAGE
CMV NEGATIVE	16	8
CMV POSITIVE	184	92
TOTAL	200	100

DISCUSSION

The seroprevalence of CMV antibody in this study was found to be 92% .This prevalence rate is higher than the figure recorded in Ibadan, Nigeria (Olaleye[4] et al 1990) where the authors found a prevalence of 54.6% among healthy blood donors in a hospital in Ibadan. The higher prevalence obtained in this study may be attributed to the difference in screening technique. A prevalence rate of 54.6% was obtained using the complement fixation test. Kositanont and Wasi[5] recorded prevalence rates of 46.8% and 84.2%, using the complement fixation and ELISA tests respectively. The result of this study is comparable with a blood donor based study in Thailand, where 95.5% of female and 82.9% of male blood donors were found to be positive for Cytomegalovirus antibodies by the ELISA method. The prevalence of 92% obtained in this study is higher than what has been recorded in other countries where Cytomegalovirus infection has been extensively studied. In the United States Of America, Meyers J D[21] and Stagno N.et al[23],

recorded prevalence rates of 50% and 85% respectively. In London Stern and Elek[6] found a prevalence of 34% among adult residents. The reasons for this higher prevalence rate are likely to be multifactorial.
- These authors noted that higher prevalence rates are expected in developing countries where CMV infection is thought to be more widespread.

-The European and American data reflected whole population studies which gave outlines of the natural history of the disease.[19-24] This contrasts with an exclusive blood donor targeted study carried out in Jos. From available literature, it is not known if geographical, racial, and genetic differences have any effects on CMV seroprevalence. Furthermore, the differences in study population will also need to be borne in mind.

Higher figures obtained in this study may suggest a rise in infection rate, considering the duration between the times of the previous studies and the present study. These findings indicate the need for more studies on CMV in developing countries. In the interim, a hospital transfusion policy is strongly advocated among patients susceptible to CMV infection. This should entail adequate screening of such patients for presence of CMV infection and if they test negative, only CMV negative blood products should be transfused. An acceptable alternative is leucocyte depleted red cells. In this light, all blood banks are encouraged to have in place, screening facilities for CMV, as well as for leucodepletion.[25]

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