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HAEMATOLOGICAL PROFILE OF CYTOMEGALOVIRUS ANTIBODY POSITIVE BLOOD DONORS IN JOS, NIGERIA.

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ABSTRACT

Background: Various kinds of Haematological abnormalities and alterations have been known to occur in a number of viral infections. These alterations define the pathology of the infection, serve as tools for diagnosis, and assist in treatment and prognostication. But much more importantly, such alterations may constitute a hazard and make an individual unfit for blood donation.
Given the high frequency of haematological alterations and complications associated with many viral infections and coupled with the observation that cytomegalovirus antibody positive persons are accepted for routine blood donation in many countries, this paper aims to evaluate the haematological profile of cytomegalovirus antibody positive prospective donors in Jos. This is with a view to recognizing and characterizing any associated abnormal haematological changes. It is also hoped that such data will assist in ascertaining the safety and fitness of seropositive persons for blood donation.

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.dialab.at**). Complete blood count (PCV: Packed cell volume, WBC: White cell count-total and differential counts, and platelet counts) was done on all donors using automated coulter machine.

Results: Although the mean PCV value was higher in the CMV positive (38.04) than in the CMV negative donors (37.25), there was no significant statistical difference between the two groups ($p>0.05$).Among the CMV negative donors the mean Total WBC, Granulocyte, lymphocyte, middle cells (basophils, eosinophils and monocytes), and platelet counts were higher than those of CMV positive donors, but there was also no statistical difference between the two groups ($p>0.05$).

Conclusion: There were no abnormal alterations in the full blood count profile of cytomegalovirus antibody positive prospective blood donors in Jos. Seropositive individuals can safely donate blood, provided there are no other contraindications.

Key Words: Cytomegalovirus, antibody, blood donors *(Accepted 2 January 2009)*

INTRODUCTION

The laboratory and especially Haematological manifestations and complications of viral infections have been described in several studies.[1-10]Cytomegalovirus remains one of the most pathogenic of the herpes viruses with a correspondingly high morbidity and mortality especially among immunocompromised hosts.[11,12]Studies have demonstrated a high prevalence of cytomegalovirus infection among various selected groups, including blood donors.[13-16]Many authors have documented a range of haematological derangements in acute cytomegalovirus infection and cytomegalic inclusion disease.[17-23]It has been observed by Horwit et al that thrombocytopaenia, atypical lymphocytosis and variable cytopaenias are among the commonest haematological complications of cytomegalovirus induced infectious mononucleosis.[18] While noting that screening for CMV is not yet a routine predonation test in many countries, cytomegalovirus antibody seropositive individuals are commonly accepted for blood donation in other countries where CMV screening is a component of pre donation algorithm. The authors are not aware of any study on the haematological profile of cytomegalovirus antibody seropositive persons. The objective of this study is to determine any abnormal haematological derangements that may be attributable to cytomegalovirus infection. This is with a view to ascertaining the safety and fitness of seropositive individuals for routine blood donation since abnormal haematologic profile can constitute a donor hazard.

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MATERIALS AND METHODS

The study was conducted at the blood bank of the Jos University Teaching Hospital, (JUTH), Jos from October 2006 to December 2006.Two hundred prospective blood donors were recruited into the study. They formed part of the general healthy population. Their serum samples were taken and analyzed for the presence of cytomegalovirus antibodies and full blood counts. All cytomegalovirus antibody tests were done using kits manufactured by "Dialab" Austria (www.dialab.at) .The kit is based on ELISA methodology. The manufacturer's procedures were strictly followed. Full blood counts were done using automated coulter machine. With the aid of a questionnaire, relevant personal, social and demographic information were obtained from the donors. Ethical approval was obtained from the research and ethical committee of JUTH, Jos. Informed consent was obtained from all the participants. The data were analyzed using Epi info computer software version 3.3.2.Simple proportion was used to determine the number of donors positive for CMV. Means of haematological parameters were cross tabulated against CMV status to determine if there was any relationship. Probability (p) values of <0.05 were taken as significant.

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. (Table 1). One hundred and eighty four donors (92%) were positive for CMV antibodies.

(Table 2,). Figure 1) show a standard (calibration) curve, plotted to determine the CMV antibody status of donors. Donors with antibody levels in excess of 0.5 iu/ml were regarded as seropositive.[25] Table 3 showed statistical evaluations of the haematological parameters and CMV status of donors: All probability values were >0.05.

Table 1: **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 2: **Seroprevalence of CMV Antibody in Jos.**

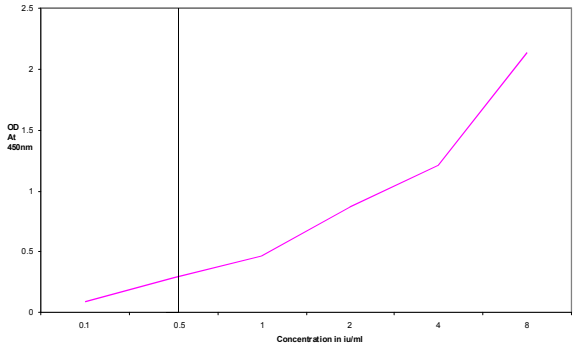
	Number of Subjects	Percentage
CMV Negative	16	8
CMV Positive	184	92
Total	**200**	**100**

Table3: **Haematological Parameters of Cytomegalovirus Positive and Negative Blood Donors.**

Haematological Parameter	Mean For Cmv Positive (N=184)	Mean For Cmv Negative (N=16)	Significance (P-Value)
Pcv (%)	38.04±4.58	37.25±2.59	
Total Wbc($X10^9$/L)	5.70±1.59	5.33±1.36	
Granulocytes (%)	50.34±6.02	54.53±10.49	P>0.05
Lymphocytes (%)	37.7±10.38	41.83±9.30	
Mi Cells (%)	7.48±5.24	7.85±5.21	
Platelets($X10^9$/L)	223.55±86.79	216.13±71.08	

Key: Mean values =mean ± standard deviation (SD)
N=Sample size
MI cells=Eosinophils, Basophils, and Monocytes

Figure 1: **Standard (calibration curve) of serum CMV antibody levels of prospective donors.**



(Seropositivity= >0.5 iu/ml, OD=Optical density)

DISCUSSION

Knowledge of the haematological profile of cytomegalovirus antibody positive persons is viewed to be important by authors, as these individuals are often accepted as donors for blood donation in many countries, despite their positive viral serology/status. The general view is that cytomegalovirus is a benign opportunistic pathogen that is not likely to produce clinical infection in the immunocompetent hosts.[18,19]This may be why some countries do not routinely screen for Cytomegalovirus antibodies prior to blood donation. While some have recommended routine screening for CMV antibodies among all prospective blood donors, other authors suggested that screening for CMV should be included only in the screening algorithm for potentially susceptible recipients of blood and blood products.[24]

This study observed no statistically significant difference in the haematological profile of CMV seronegative and seropositive donors and noted all values to be within the reference ranges for the normal population. This is not entirely surprising, as it is widely thought that haematological complications and derangements are seen mostly in the context of acute cytomegalovirus infections and cytomegalovirus associated infectious mononucleosis[17-22].Tsaparas et al also observed the incidence of haematological complications attributable to CMV to be more common among immunocompromised patients who may suffer anaemia, Neutropaenia,thrombocytopaenia,and atypical lymphocytosis.[23] The result of our study, however, differs from similar studies in which other viruses have been noted to produce a variety of haematological complications and abnormalities[1-10] which may constitute a health hazard to an individual intending to donate. The complication of thrombocytopaenia attributable to a variety of viral infections is well documented.[1,3,5-7]

However, even though our study has shown a normal full blood count profile of CMV seropositive prospective blood donors, this does not by any means suggest that there may be no other haematological abnormalities in these individuals. Attention was paid mainly to the quantitative blood cell counts (PCV, WBC-total and differential and platelet counts) by the authors probably because these are the parameters that are more likely to disqualify an individual who intends to donate. The authors are aware that a few other parameters included under the full blood count were not assessed in this study. Qualitative blood cell assessment (blood film morphology) readily comes to mind. While this is an important component of the full blood count, the authors feel blood film abnormalities may not be sufficient enough to conclusively disqualify a potential donor, or constitute a risk to blood donation.

A variety of other haematologic alterations of viral infections, but which may not necessarily pose a risk to blood donation exist. It is suggested that further studies with a larger sample size, and incorporating more haematological indices might help in properly evaluating, defining and characterizing the haematological manifestations of cytomegalovirus.

CONCLUSION

In conclusion, this study has shown that cytomegalovirus seropositive prospective blood donors in Jos rarely present with abnormal full blood count profile. Such persons are fit to donate blood, and should be accepted for blood donation, provided there are no other contraindications.

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