The Value Of Clinical Parameters In Cytomegalovirus Infection Among Antibody Sero- Positive Blood Donors In A Nigerian Teaching Hospital

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Citation

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Abstract

Background:Cytomegalovirus (CMV), otherwise called human herpes virus type 5 is a systemic and infectious disease that can present with diverse clinical manifestations. Some of these manifestations do have diagnostic significance. The aim of the study was to highlight the clinical parameters CMV antibody seropositive blood donors present with and their diagnostic significance.Methods:Detailed history and thorough physical examination were carried out on 184 CMV antibody seropositive prospective blood donors at the blood bank of the Jos University Teaching Hospital, Jos, with a view to eliciting symptoms and signs that would normally indicate the presence of an infectious and systemic disease. Thermometer was used to determine the temperature level of each blood donor.Results:One hundred and sixty five donors (90%) were asymptomatic, while 5% had fever measuring 38.3°C. Five seropositive donors (2.7%) presented with sore throat, while 4 donors (2.2%) had fatigue. Only one donor (0.5%) had a history of previous blood transfusion. One hundred and seventy two donors (94%) had no demonstrable physical signs. Pallor was found in 5.4% of donors. There was no evidence of significant lymphadenopathy or hepatosplenomegaly in any of the donors.Conclusion:The study shows that clinical manifestations in CMV seropositive blood donors are non specific and are therefore not of any diagnostic significance. Most seropositive persons are asymptomatic.

INTRODUCTION

Cytomegalovirus (CMV), otherwise called human herpes virus type 5 (HHV5), is one of the human herpes viruses that may present with diverse signs and symptoms[123456789]. Available literature suggest that such systemic viral infections may exhibit a spectrum of clinical manifestations that range from completely asymptomatic to most severe forms of clinical presentation. Clinical features attributable to CMV can be congenital or acquired[1]. Congenital infections manifest with intrauterine growth retardation (IUGR), jaundice, hepatosplenomegaly, thrombocytopaenia and encephalitis with or without microcephaly[8]. In the neonate, CMV is now known to be the commonest cause of congenital infections, affecting around 0.3-1% of all life births[10]. About 5-10% of congenitally infected infants have symptoms at birth, while fatal disease occurs in 20% of these infants[8]. With postnatal infections and other forms of acquired infections, the incubation period (IP) is thought to be 3-12 weeks[1112] .Primary CMV infection in the postnatal period is usually mild or asymptomatic but can occasionally be accompanied by the syndrome of infectious mononucleosis that is symptomatically indistinguishable from EBV- induced infectious mononucleosis with malaise, fever of up to 39-40°C, chills, sore throat and headache as the typical presenting features[13]. Lymphadenopathy is however uncommon in CMV induced mononucleosis. Primary CMV infection in the immunocompromised patients is far less likely to be asymptomatic and commonly presents with spiking pyrexia, gut and retinal involvement and pneumonitis which cause grave prognosis with 80-90% mortality[8141516]. Diagnosis of CMV should be suspected if a patient has symptoms of infectious mononucleosis but has negative test results for Infectious Mononucleosis and EBV or has negative heterophile antibody test[17]. Hence, like any other clinical case, history and physical examination should serve as relevant tools in accurate diagnosis of CMV infection. Given that CMV is a transfusion transmissible viral infection, laboratory physicians should be interested in the clinical profile of CMV antibody seropositive blood donors. More so because clinical evaluation by way of

history taking and physical examination constitute a critical part of the initial sorting and assessment of prospective blood donors. It is against this backdrop that this study emanated.

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 this prospective study. Their blood samples were screened for the presence of CMV antibodies. Excluded from the study were pregnant females and donors with language barrier. All tests were done using kits manufactured by "Dialab" Austria (www.dialab.at) .The kit is based on ELISA principles and technique. The manufacturer's instructions as well as procedures were strictly adhered to or followed. All donors who tested positive for CMV antibodies proceeded with the study while negative donors were excluded at this stage. Detailed history and thorough physical examination were carried out on all CMV seropositive donors with a view to eliciting signs and symptoms that would normally indicate the presence of an infectious and systemic disease. Standard thermometers used to measure both buccal cavity and armpit or axillary body temperatures in order to objectively determine clients' febrility or otherwise. This stage of the study was observational and results were described as numbers and percentages. Ethical approval was obtained from the Research and Ethical Committee of JUTH. Informed consent was obtained from all participants. The data were analyzed using Epi info computer software version 3.3.2.

RESULTS

A total of 200 prospective blood donors who presented for bleeding were screened. One hundred and eighty four donors tested positive for Cytomegalovirus antibodies, representing a prevalence rate of 92 %.(table I).The age range of the study population was between 19 and 55 years, with a mean of 37 years. The age distribution and CMV antibody seropositivity among donors is shown in table I. Of the 184 donors who are positive for CMV, 97.8 % (=180 donors) were males while 2.2% (=4 donors) were females, the two groups were however merged due to the number of females which was rather small for a separate statistical consideration. CMV antibody prevalence was highest in the 25-29 years age group (30.4%) and lowest in the extreme age groups (1.6%). Figure 1 shows 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[18]. The clinical findings in CMV antibody seropositive donors were recorded in table II. One hundred and sixty five donors (90%) were asymptomatic while 5% had fever with the average temperature of 38.3*C. Five seropositive donors (2.7%) presented with sore throat, while 4 donors (2.2%) had fatigue. Only one donor (0.5%) had a history of previous blood transfusion. With respect to physical signs on examination, One hundred and seventy two donors (94%) had no demonstrable physical signs. Pallor was found in 5.4% of donors. None of the donors presented with skin rash. There was no evidence of significant lymphadenopathy or hepatosplenomegaly in any of the donors.

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DISCUSSION

The high proportion of donors (90%) who were asymptomatic and who revealed no clinical abnormality on complete physical examination (94%) confirms the common impression that CMV infection is usually asymptomatic especially among immune competent persons[23]. The results are therefore not surprising. Studies conducted among immunocompromised patients indicate that it is such patients that are more likely to present with the classic symptoms of cytomegalovirus infection[8141516] . Other authors have documented similar patterns of asymptomatic presentation of CMV infection although not necessarily among blood donors[4]. These observations indicate the opportunistic tendency of cytomegalovirus. Most of the other papers cited by us showed that other herpes and non-herpes viral infections may present with diverse signs and symptoms[1920212223242526]. The possible reasons for this difference in clinical behavior may be difficult to clearly highlight now. However, bearing in mind that clinical manifestations emanate from underlying pathophysiology, differences in virus induced pathophysiological mechanisms may be a plausible factor. The results of this study show that most seropositive blood donors are asymptomatic. These donors were predominantly aged between 20 and 55 years and represent a largely "well" segment of the general population and should mirror closely the overall pattern of CMV presentation in the general population. The implication of this is that the general population will need

appropriate health education and public enlightenment on this seemingly clinically benign virus. More especially, immunocompromised individuals will need to be informed that they are particularly at risk of fatal complications and outcomes from CMV. There is therefore a need for this group of the population to know their CMV status, and insist on CMV negative blood units whenever transfusion is indicated. In analyzing the results of this study, it will be noted that there was no control group. The study design was essentially an observational study, with a descriptive design. Further analytical studies utilizing suitably selected control groups are needed to better highlight the spectrum of clinical presentation and tendencies of Cytomegalovirus.

In conclusion, this study has shown that clinical manifestations in CMV seropositive blood donors are non-specific and are therefore not of any diagnostic significance. Most seropositive donors are asymptomatic. These findings indicate that diagnosis of CMV infection anchors on laboratory parameters. Consequently, management of health institutions in general, and laboratories in particular are encouraged to put in place adequate facilities for CMV diagnosis.

References

1. Carbonero MJ, Torronteras R, Cintado BC. Infectious mononucleosis: study on hospitalized children. An Esp Pediatr.1999 ;51(6):664-6
2. Lajo PA, Castillo MF, Martínez ZR. Mononucleosis caused by cytomegalovirus. An Esp Pediatr. 1990; 32(1):20-3.
3. Evci C, Akalin H, Heper Y, Yilmaz E, Bakir OS, Mistik R,. Retrospective evaluation of patients who were diagnosed as infectious mononucleosis between 1984-2005. Mikrobiyol Bul. 2007; 41(1):95-100
4. Horwitz CA, Henle W, Henle G, Snover D, Rudnick H,. Clinical and laboratory evaluation of cytomegalovirus-induced mononucleosis in previously healthy individuals. Report of 82 cases. Medicine (Baltimore). 1986 Mar; 65(2):124-34.
5. Chee SP, Bacsal K, Jap A, Se-Thoe SY, Cheng CL, Tan BH. Clinical features of cytomegalovirus anterior uveitis in immunocompetent patients. Am J Ophthalmol. 2008 May; 145(5):834-40.
6. Lajo A, Borque C, Del Castillo F, Martín-Ancel A. Mononucleosis caused by Epstein-Barr virus and cytomegalovirus in children: a comparative study of 124 cases. Pediatr Infect Dis J. 1994 Jan; 13(1):56-60.
7. Wakiguchi H, Hisakawa H, Kubota H, Kurashige T. Serodiagnosis of infectious mononucleosis in children. Acta Paediatr Jpn. 1998 Aug; 40(4):328-32.
8. Meyers, J.D., & Dandliker P.S Symptoms and signs of Cytomegalovirus infections. New England Journal of medicine. 1998; 318: 70-75.
9. Goodwich, J.M., and Bowden, R. Organ invovelment and changes in Cytomegalovirus infection. Journal of Clinical infectious disease 1994; 19:287-298.
10. Lang D.J. The epidemiology of Cytomegalovirus infection, interpretation of recent observation. IN: Knigman, S Gershon, A.A Infection of the fetus and New born infants. New York Liss 1995; 33-45.
11. Leinikki, P., Heinonem, K and Pettay, O. Incidence of cytomegalovirus infections in early childhood. scand J. Inf. Dis.1996; 4:1-5.
12. Smith,T.F Cytomegalovirus infection, current concepts. Mayoclin. Proc.1994; 56:767.
13. Atkmson, K. and Downs.classical presenting features of infectious mononucleosis. British Journal of Haematology 1995; 79: 57-62.
14. Crippa F, Corey L, Chuang EL, Sale G, Boeckh M. Virological, clinical, and ophthalmologic features of cytomegalovirus retinitis after hematopoietic stem cell transplantation. Clin Infect Dis. 2001; 32(2):214-9.
15. Eid AJ, Bakri SJ, Kijpittayarit S, Razonable RR. Clinical features and outcomes of cytomegalovirus retinitis after transplantation. Transpl Infect Dis. 2008 Feb;10(1):13-8.
16. Choi YL, Kim JA, Jang KT, Kim DS, Kim WS, Lee JH. .Characteristics of cutaneous cytomegalovirus infection in non-acquired immune deficiency syndrome, immunocompromised patients. Br J Dermatol. 2006 Nov; 155(5):977-82.
17. Syndman DR and Wener B.G. Laboratory abnormalities in cytomegalovirus infection. Annals of internal medicine.1993; 10: 984-991.
18. "Dialab" Austria http://www.dialab.at
19. Caviness AC, Demmler GJ, Selwyn BJ. Clinical and laboratory features of neonatal herpes simplex virus infection: a case-control study. Pediatr Infect Dis J. 2008 May; 27(5):425-30.
20. Arduino PG, Porter SR. Herpes Simplex Virus Type 1 infection: overview on relevant clinico-pathological features. J Oral Pathol Med. 2008 Feb; 37(2):107-21.
21. Zerr DM. Human herpesvirus 6: a clinical update. Herpes. 2006 May; 13(1):20-4.
22. Krabbe S, Hesse J, Uldall P. Primary Epstein-Barr virus infection in early childhood. Arch Dis Child. 1981 Jan; 56(1):49-52.
23. Steiner I, Kennedy PG, Pachner AR. The neurotropic herpes viruses: herpes simplex and varicella-zoster. Lancet Neurol. 2007 Nov; 6(11):1015-28.
24. Steeper TA, Horwitz CA, Ablashi DV, Salahuddin SZ, Saxinger C, Saltzman R,. The spectrum of clinical and laboratory findings resulting from human herpesvirus-6 (HHV-6) in patients with mononucleosis-like illnesses not resulting from Epstein-Barr virus or cytomegalovirus. Am J Clin Pathol. 1990 Jun; 93(6):776-83.
25. Nagel MA, Cohrs RJ, Mahalingam R,et al. The varicella zoster virus vasculopathies: clinical, CSF, imaging, and virologic features. Neurology. 2008 Mar 11; 70(11):853-60.
26. De Bolle L, Naesens L, De Clercq E. Update on human herpesvirus 6 biology,clinical features, and therapy. Clin Microbiol Rev. 2005 Jan; 18(1):217-45.

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