THE PREVALENCE OF HUMAN CYTOMEGALOVIRUS SEROPOSITIVITY AMONG BLOOD DONORS AT THE UNIT OF BLOOD TRANSFUSION MEDICINE, HOSPITAL UNIVERSITI SAINS MALAYSIA

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Abstract. Human cytomegalovirus (HCMV) is a species-specific DNA virus of the Herpetoviridae family. After a primary infection, HCMV persists in a latent form most probably in bone marrow progenitor cells or in peripheral blood monocytes. The virus can reactivate to result in shedding of the virus leading to virus dissemination and new infections. Immunocompromized patients are the ones most vulnerable to serious diseases occasionally acquired in blood transfusions. In a human population, HCMV seropositivity increases steadily with age to become approximately 100% in adults. This study was performed to detect seropositivity among regular blood donors in The Hospital of the Universiti Sains Malaysia, in the state of Kelantan. Using an enzyme immunoassay, it was found that 97.6% of blood donors were HCMV-positive. HCMV is highly prevalent and may be endemic in Kelantan. Hence, long-term strategies are required for the reduction of disease dissemination, and to prevent the exposure of immunocompromized patients to the virus.

INTRODUCTION

Human cytomegalovirus (HCMV) is a herpesvirus which is present as a latent infection in a majority of the population in many countries (Hoffbrand and Lewis, 1997; Roback, 2002). It causes a potentially dangerous infection that may become devastating to immunocompromized patients. Rates of seropositivity differ in different parts of the world: in the western countries it range from 40-79% (Galea and Urbaniak, 1993; Abuharfeil and Meqdam, 2000; De Ory Manchon et al, 2001; Hecker et al, 2004; Alanen et al, 2005), whereas in Africa and Asia they are about 96-100% (Kositanont et al, 1985; Zhao and Shao, 1989; Urwijitaroon et al, 1993; Lu et al, 1999; Gargouri et al, 2000; Pultoo et al, 2001; Kothari et al, 2002). Since there is no effective treatment for this infection, prevention remains the most effective way to avoid HCMV infection, which is most commonly transmitted through contaminated or infected blood. Blood transfusion is a dangerous source of HCMV and screening blood donors for HCMV becomes mandatory to provide “HCMV-safe” blood and blood components for patients, especially immunocompromized ones.

In Malaysia, a percentage of human cytomegalovirus seropositivity exceeding 91% was reported among multiply transfused thalassemic patients (Jamal et al, 1998). The prevalence of HCMV in the general population and among blood donors in Malaysia has not been documented. This work was performed to determine the frequency of HCMV seropositivity among regular blood donors in the state of Kelantan and to utilize the data obtained to outline proper strategies for reducing new HCMV infections through blood transfusion, especially in immunocompromized patients.

PATIENTS AND METHODS

Written consents were obtained from regular blood donors at the Blood Transfusion Medicine Unit, Hospital USM. Age, gender and pe-
Period of blood donation for each of the donors were recorded. Detection of anti-HCMV antibodies was carried out on the sera of 172 healthy blood donors. The blood was processed immediately and the sera collected and stored at -20°C until used. Anti-HCMV IgG levels were estimated using the Abbott AxSYM System in which a microparticle enzyme immunoassay (MEIA) was utilized. In brief, calibration procedures were performed and validated using positive and negative controls provided. Microplates coated with the human HCMV strain (AD 169) were incubated with the test sera. After washing in Tris buffer, anti-human IgG conjugated with alkaline phosphatase was added, washed, and reaction probed with methylumbelliferyl phosphate. Positive and negative controls were provided and utilized for system calibration. Assay results of less than 15 AU/ml were considered negative for IgG antibodies to HCMV. Samples with results > 15 AU/ml were considered positive, indicating the presence of a past or a current infection.

RESULTS

The ages of donors ranged from 18 to 47 years, with a mean age of 29.3 years. There were 74 female donors and 98 male donors who were divided into groups of young adult males and females (Ages 18-30 years), and older adults >30 years (Fig 1).

HCMV IgG was positive in 168 blood samples; only 4 samples were negative for HCMV IgG. Hence, the prevalence of positive HCMV IgG among the donors was 97.6%. All 4 negative donors were females with ages between 18 and 21 years (Fig 2).

DISCUSSION

In this study, 168 donors out of 172 were found to be positive for HCMV IgG (97.6%). This result indicates that the extent of exposure in the human population in the state of Kelantan to the virus is equivalent to that of the surrounding communities in Southeast Asia (Kositanont et al, 1985; Zhao and Shao, 1989; Urwijitaroon et al, 1993; Lu et al, 1999; Pultoo et al, 2001; Kothari et al, 2002). One reason for this distribution was the relatively low socioeconomical status and closeness of contacts within this population (De Jong et al, 1998).

The only 4 donors that turned out to be negative were young females. Being young was expected, since the seroconversion rate suggested that the risk of primary HCMV is a lifelong event and correlates with age and gender (Hecker et al, 2004). Females were generally less likely to be negative compared to males, since the number of males was higher than females in this study. This may not be a significant finding with the relatively low sample size in the study.

It can be concluded that HCMV is endemic in the population of Kelantan State. For this reason, blood recipients should be screened for HCMV, and only the negative ones should receive HCMV-free blood or blood products, especially young patients who have not been exposed previously to the virus. In addition, infection with HCMV via blood may endanger immunocompromized patients requiring trans-
fusion therapy, even if they are positive for HCMV antibodies. These findings point out the need for the availability of leukodepleted blood products and HCMV-free blood when requested.

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REFERENCES


