

PREVALENCE OF CYTOMEGALOVIRUS ANTIBODY IN THAI-NORTHEASTERN BLOOD DONORS

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ได้ทำการศึกษาร่องรอยการติดเชื้อ Cytomegalovirus (CMV) ในซีรัมของ
ผู้บริจาคโลหิตภาคอีสาน จำนวน 359 ราย อายุระหว่าง 17-59 ปี โดยการ
ตรวจหา total CMV antibody (anti-CMV) วิธีอิมมูโนฟลูออเรสเซนซ์แบบอิมมูโน
ต่อ CMV ทั้งหมด 93.31% โดยพบในเพศชาย 91.53% และหญิง 97.30% ซึ่ง
ผลการตรวจที่ได้ไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติระหว่างเพศและ
อายุ ($P > 0.05$)

เมื่อศึกษาหาแอนติบอดีชนิด IgM ต่อ CMV ในซีรัมที่ให้ผลบวก
anti-CMV จำนวน 180 ราย พบผลบวกเพียงหนึ่งรายเท่านั้น

การศึกษานี้แสดงให้เห็นว่ามีการติดเชื้อ CMV ในประชากรชาวอีสาน
สูง จนทำให้มีโอกาสน้อยมากที่จะหาเลือดที่ปราศจากร่องรอยการติดเชื้อ CMV
ให้แก่ผู้ป่วยทารกหรือผู้ป่วยภูมิคุ้มกันต่ำได้ ดังนั้นวิธีที่ดีที่สุดที่จะป้องกันการ
ติดเชื้อ CMV จากการรับเลือดในผู้ป่วยดังกล่าวก็คือ ต้องใช้เลือดที่มีเม็ดเลือดขาว
เจือปนน้อยที่สุด

ABSTRACT

The prevalence of cytomegalovirus antibody was studied in sera of 359 Northeastern blood donors with an age range of 17-59 years by ELISA for anti-CMV total antibody (anti-CMV). Anti-CMV was detected in 93.31% (335/359) of blood donors. The prevalence in males was 91.53% (227 in 248) while female donors showed 97.30% (108 in 111) positive for anti-CMV. The result demonstrated no statistically significant difference according to sex or age.

One-hundred and eighty serum samples with positive anti-CMV were reexamined for anti-CMV IgM antibody. Only one sample was found to be positive.

This study suggested that CMV seronegative blood supply was very limited. Therefore leucocyte-depleted blood should be the method of choice for prevention of post-transfusion CMV infections in high risk recipients.

INTRODUCTION

Cytomegalovirus (CMV) is a large enveloped, double-stranded DNA virus in the human herpes virus group⁽¹⁾. Transmission of CMV through blood transfusion from seropositive donors is common. The CMV infection is usually subclinical, but it can be serious sequelae in seronegative or immunocompromised recipients^(2,3,4) such as newborn infants^(5,6) and transplant patients^(4,7,8). The use of blood from CMV seronegative donors for high risk patients has been recommended to reduce the transfusion-associated CMV infection rate.^(1,5,6)

This study was performed to determine the feasibility of supplying CMV negative blood. It was designed to investigate the seroprevalence of CMV in Thai local Northeastern blood donor by ELISA.

MATERIALS AND METHODS

Serum

Serum samples was obtained in January 1990, from 359 healthy blood donors in Khon Kaen and surrounding provinces. The samples were collected and stored at -30°C until tested. There were 248 males and 111 females with an age range from 17-59 years.

Enzyme-linked immunosorbent assay (ELISA)

Anti-CMV total antibody (anti-CMV)

Anti-CMV was tested in all of serum samples by indirect ELISA technic (ABBOTT Laboratories, USA). The method of testing was followed according to the manufacturer's instructions.

Anti-CMV IgM antibody (anti-CMV IgM)

180 serum samples (90 males and 90 females) with positive anti-CMV were reexamined for anti-CMV IgM, using Organon anti-CMV IgM ELISA reagent kit (Organon Teknika, Turnhout-Belgium).

RESULTS

The results of anti-CMV in 359 blood donors are shown in Table 1. The prevalence of anti-CMV was 93.31% (335 in 359) with 91.53% in males and 97.30% in females. Only 6.69% yielded negative anti-CMV test. There was no statistically significant difference according to sex ($P>0.05$).

The prevalence of anti-CMV in different age groups was also analysed and presented in Table 2. The prevalence seemed to be lower in younger age group than in the higher one. The range varied from 91.89% in 17-24 age

group to 100% in the 45-59 groups.

However there was no statistically significant difference of anti-CMV found in different age groups ($P>0.05$).

Table 1
Anti-CMV in blood donors

| Sex | Anti-CMV | | Total |
|--------------|--------------------|------------------|------------|
| | Positive (%) | Negative (%) | |
| Male | 227 (91.53) | 21 (8.47) | 248 |
| Female | 108 (97.30) | 3 (2.70) | 111 |
| Total | 335 (93.31) | 24 (6.69) | 359 |

Table 2
Anti-CMV in different age groups

| Age interval | Number tested | Anti-CMV positive (%) |
|--------------|---------------|-----------------------|
| 17 - 24 | 111 | 102 (91.89) |
| 25 - 34 | 140 | 129 (92.14) |
| 35 - 44 | 74 | 70 (94.59) |
| 45 - 59 | 34 | 34 (100) |
| Total | 359 | 335 (93.31) |

Anti-CMV IgM

Only one serum sample from 24 years old female was found to be positive for anti-CMV IgM.

Table 3
Anti-CMV IgM in anti-CMV positive donors

| Number tested | Number positive | Number negative |
|---------------|-----------------|-----------------|
| 180 | 1 | 179 |

DISCUSSION

There are several commercial anti-CMV test kits available in the world market, including indirect hemagglutination assay (IHA), indirect fluorescent antibody technic (IFA), ELISA and passive latex agglutination (PLA). ELISA (ABBOTT EIA), IHA (Cetus Corporation) and PLA (Hynson Wescott and Dunning) gave satisfactory results with acceptable specificity and sensitivity.^(9,10,11) Although the PLA was the method of choice for screening anti-CMV in blood bank^(8,9,10,11), it is not commercially available in Thailand yet. Therefore the ABBOTT ELISA test kit was used for this study.

The sero-prevalence of anti-CMV in Thai local Northeastern blood donors was very high (93.31%). It is statistically significant difference ($p < 0.001$) comparing it to the prevalence found in Bangkok blood donors which was 84.2%.⁽¹²⁾ The result of this study also confirmed that the prevalence of anti-CMV varied directly with age. In concordance with other investigators^(4,10,12,13) females showed higher anti-CMV than males.

This study could identify only one anti-CMV IgM positive in serum from a healthy 24 years old female, which may be due to sub-clinical reinfection or reactivation.

Results suggested that the CMV infection is very common in Thailand, particularly in the Northeastern part. The figure of prevalence found in blood donors also suggested that the CMV infection in certain high risk blood recipients should be prevented. The 93% carrier rate of CMV in the local blood donors indicated that the CMV negative blood supply was very limited.

Since CMV is a cell-associated virus, the transmission appeared to be due to the reac-

tivation of a latent virus in white blood cells.^(3,14,15) Prevention of transfusion-associated CMV infections in infants and immunocompromised patients can be done by using leucocyte-depleted blood either by leucocyte filtration^(14,16) or counter-flow centrifugation technics.⁽¹⁷⁾ We would recommended that with the high prevalence rate of anti-CMV among blood donors, the method of choice for prevention of post-transfusion CMV infections in high risk recipients should be the providing of leucocyte-depleted blood.

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