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COMMUNICATION IV

CD4/CD8 Ratios among Blood Donors in Penang

ABSTRAK

Dalam kajian ini, nilai nisbah CD4/CD8 (Th/Ts) di kalangan penderma darah daripada pelbagai kumpulan bangsa di Pulau Pinang telah diwujudkan. Julat nisbah CD4/CD8 di kalangan penderma darah di Pulau Pinang yang diperoleh daripada kajian ini ialah 0.75-2.13 dengan puratanya 1.36. Signifikasi varibel biologi seperti umur dan bangsa ke atas nisbah tersebut juga ditentukan dalam kajian ini. Tiada perbezaan yang signifikan untuk julat nisbah CD4/CD8 di antara bangsa Melayu, Cina dan India, serta tiada perbezaan yang signifikan pada nisbah CD4/CD8 mengikur umur mereka.

ABSTRACT

In this study, the value for CD4/CD8 (Th/Ts) ratios among blood donors of various ethnic groups in Penang was established. The range of CD4/CD8 ratio among blood donors in Penang obtained from this study was 0.75-2.13 with the mean of 1.36. The significance of biologic variables such as age and race on the ratio was also determined in this study. There was no significant difference for the range of CD4/CD8 ratio between Malays, Chinese and Indians. Likewise, there was also no significant difference for CD4/CD8 ratio in terms of their age.

INTRODUCTION

Two subsets of T cells namely T helper (Th)/T inducer (Ti) and T cytotoxic (Tc)/T suppressor (Ts) lymphocytes are known to be involved in the regulatory function of the immune system. These two subsets are different from one another in terms of their surface characteristics and functions. Th/Ti and Tc/Ts cells express surface markers designated CD4 and CD8 respectively. In terms of their functions, the Th/Ti cell subset is involved in induction (helper/inducer) of the immune response, whereas the Ts cell subset is involved in the suppression of the immune response. It is clear that the proportion of these two subsets (Th/Ti and Ts) determine the status of the immune system of the individual.

Imbalance or changes of these immunoregulatory T cell subsets have been found in many pathological conditions such as systemic lupus erythematosus, AIDS, rheumatoid arthritis, sarcoidosis, measles, atopic dermatitis, and lymphoproliferative disorders (Fauci *et al.* 1978; Hunninghake *et al.* 1981; Reinherz and Schlossman 1980; Fahey *et al.* 1984; Alpert *et al.* 1984; Aisenberg 1981). Therefore, the Th/Ts ratio or generally known as CD4/CD8 ratio has diagnostic or prognostic significance in many clinical conditions, if it is used together with clinical features and other laboratory values. National standards for normal range of this ratio have not been established, so the aim of this preliminary study was to obtain the value for CD4/CD8 ratios among blood donors of various ethnic groups in Penang.

MATERIALS AND METHODS

Peripheral blood was obtained from 79 blood donors at Penang General Hospital. The majority of donors were male, with ages ranging from 22 to 56 years and were from different ethnic groups. Peripheral mononuclear cells were isolated from citrated blood by means of Ficoll-Hypaque gradient centrifugations (Sigma). The T cell subsets (Th and Ts cells) were determined with OKT4 and OKT8 monoclonal antibodies (Ortho Diagnostic System Inc.). 10^6 cells /ml in 100 µl PBS containing 0.2% sodium azide were incubated for 60 min at 4°C with 5 µl monoclonal antibody.

As for control (non-specific staining), the cells were incubated as above with 5 µl PBS. The cells were washed twice and the pellet was incubated for 45 min at 4°C with 100 µl of 1:50 diluted FITC-labeled rabbit anti-mouse IgG (Behring). The cells were washed twice as before and finally mounted on microscopic glass slide and analysed in fluorescence microscopie. Two hundred cells were counted in all samples.

RESULTS

Table 1 summarizes the results of CD4/CD8 ratio tests performed on 79 samples of the blood donors (all donors had normal total lymphocyte count). The range of CD4/CD8 ratio among blood donors in Penang obtained from this study was 0.75-2.13 with the mean of 1.36. Normal range for CD4/CD8 ratio was expressed as percentile from 2.5th (mean-2SD) to 97.5th (mean + 2SD). From this normal range, it is found that only a few blood donors have CD4/CD8 ratio beyond 0.8 or 1.92.

TABLE 1
CD4/CD8 ratios of Penang Blood Donors

Percentile[a]	CD4/CD8 ratio
2.5th	0.80
16th	1.08
50th (median)	1.36
84th	1.64
97.5th	1.92

a - Percentile was calculated as mean + one or two Standard Deviation.

The significance of biologic variables such as age and race on the ratio was also obtained from this study. There was no significant difference for CD4/CD8 ratio between Malays, Chinese and Indians (Table 2). Likewise, there was also no significant difference for CD4/CD8 ratio in terms of age. The age of the donors was divided into 4 difference groups (Table 3).

TABLE 2
Range for CD4/CD8 ratio with regards to races

Race	No. of samples	CD4/CD8 range
Chinese	32	0.86-2.05
Indian	24	0.75-2.13
Malay	21	0.81-1.99
European	2	1.34-1.63

TABLE 3
Range for CD4/CD8 ratio with regards to age

Age group	No. of samples	CD4/CD8 range
21 - 30	32	0.81 - 2.13
31 - 40	27	0.86 - 2.05
41 - 50	16	0.75 - 1.99
51 - 60	4	1.20 - 1.52

DISCUSSION

The ratios for two lymphocyte subsets, T helper (CD4) and T suppressor (CD8) obtained from the blood donors in Penang were studied. This was done in order to obtain the range for CD4/CD8 ratio in the blood donors, before a national standard for CD4/CD8 ratio can be established. This is important because before one can consider using such parametres as diagnostic or prognostic value in clinical situations, a normal range must be obtained. The range for CD4/CD8 ratio obtained from our study was 0.75-2.13 with the mean of 1.36. In contrast to another study (Burton 1983), our results indicate that there was no significant difference for CD4/CD8 ratio in terms of race and age. This may be due to the small sample size in the study. This preliminary study was not intended to establish the normal reference range or national standard for CD4/CD8 ratio. This is because we did not have the clinical background of the blood donors and the level of the two lymphocyte subsets is affected by the health status of an individual.

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