

COMPARISON OF CD4+ T CELLS IN HIV-INFECTED PATIENTS WITH TUBERCULOSIS AND NON HIV-INFECTED PATIENTS WITH TUBERCULOSIS AFTER ANTI-TUBERCULOUS TREATMENT

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SUMMARY

A prospective study of CD4+ T lymphocytes along the course of treatment among 25 HIV-infected patients with active tuberculosis (TB) receiving antituberculous drugs was compared with 32 non HIV-infected patients with active TB also receiving the same regime. The CD4+ T cell count among non HIV-infected patients was $525 \pm 415/\text{mm}^3$ which increased to $675 \pm 378/\text{mm}^3$ and $902 \pm 267/\text{mm}^3$ at the third and sixth month of therapy respectively. Among HIV-infected patients, the CD4+ T cell count was $72 \pm 45/\text{mm}^3$ which decreased to $50 \pm 25/\text{mm}^3$ and $42 \pm 20/\text{mm}^3$ at the third and sixth months of therapy ($P < 0.05$).

INTRODUCTION

Infection with the human immunodeficiency virus (HIV) produces profound defects in cell mediated and humoral immunity, resulting in the acquired immunodeficiency syndrome (AIDS).¹ The virus preferentially attacks CD4+ bearing T lymphocytes, leading to a progressive decrease in their absolute number.^{2,3} The effect of TB on the course of HIV infection has been the subject of much speculation.⁴ It is plausible that active TB facilitates HIV-induced immunological deterioration, since active TB is associated with transient CD4+ T lymphocyte depression in patients without HIV infection.⁵ To evaluate these effects on CD4+ T Lymphocyte, we conducted a prospective study of CD4+ T lymphocytes

in HIV-infected patients with active tuberculosis and non HIV-infected patients with active tuberculosis, both receiving antituberculous therapy.

MATERIAL AND METHODS

From November, 1995 to September, 1996 we prospectively studied CD4+ T cell counts in 32 non HIV- infected patients with active tuberculosis (group I), and 25 HIV infected patients with active tuberculosis (group II).

Tuberculosis was confirmed by the presence of acid fast bacilli in the specimen (Zeil Nelson stain), Chest radiographs and cultures. Those patients who consented to HIV serological testing were included in the study. Demographic and clinical information

and a medical history were obtained and physical examination was performed.

Serum specimen were collected and tested for anti HIV antibody (two times with ELISA and once with particulate agglutination test). Pre HIV and post HIV test counselling was given to all patients and confidentiality was maintained throughout the study. Whole blood samples were collected for CD4 lymphocyte phenotyping by flow cytometry (FAC Scan; Becton Dickinson, Erembodegem, Belgium). Specimen were consistently drawn between 7:00 am and 9:00 am to minimize the effects of diurnal variation on absolute CD4 counts.⁶ All patients received the standard, 0.1 ml (5 TU) of PPD (Thai Red Cross) intradermally on the forearm by the Mantoux technique and the induration was measured after 48- 72 hours. Anergy was labeled as no skin reaction after 72 hours.

CD4+ T cell counts and tuberculosis tests were conducted at the beginning of the treatment, which usually included isoniazid, rifampicin, pyrazinamide and ethambutol for 2 months followed by isoniazid and rifampicin for 4 months. We subsequently followed CD4+ T cell counts at the third and sixth months of the treatment.

Statistical analysis

Data was entered in a data base and analyzed with the EPI info version 6 software program on IBM compatible computer. Student's test was used to compare the CD4 + T cell counts between the two groups. P value of less than 0.05 was considered significant.

RESULTS

The two groups of TB patients were well matched for age and sex. There were 24 males and 8 females in group-I, the average age was 30 ± 7.2 years.

Table I shows the absolute CD4+ T Lymphocyte counts in the two groups at the

TABLE - I
ABSOLUTE CD4+ T COUNTS/MM³
BEFORE AND AFTER
ADMINISTRATION OF
ANTITUBERCULOUS DRUGS
(MONTHS OF TREATMENT).

	0	3	6 months
Group I (n=32) Non - HIV active TB	525+215	675+378	902+267
Group II (n=25) HIV, active TB	72+ 45	50+ 25	42+ 20
P < 0.05			

beginning of treatment, at 3 months, and at 6 months.

Group I

The mean CD4+ T cell count was $525 + 415/\text{mm}^3$ and gradually increased during therapy. One female patient's CD4+ T lymphocyte counts were below $200/\text{mm}^3$ but it increased to $346/\text{mm}^3$ and $583/\text{mm}^3$ at the third and sixth months of follow-up. Her tuberculin test was negative, while the rest of Group I's tuberculin tests were strongly positive (5-19 mm).

Group II

The mean CD4 T cell count in group II was much less than in group I and decreased further during treatment. One male patient developed tubercular meningitis at the third month, his CD4 + T cell counts dropped from $36/\text{mm}^3$ to $8/\text{mm}^3$ and he died during that period. The tuberculin test was negative for most (84%) of the patients. Only 4 of 25 patients (16%) showed reaction between 1-9 mm, while 21 of 25 patients (84%) showed zero reaction.

DISCUSSION

The AIDS virus can infect all cells expressing the T4 CD4 antigen, which

serves as a receptor for HIV. The cell primarily infected is the CD4 (helper induces) lymphocyte. Other cells infected in the immune net work are B-lymphocytes and macrophages. With the increasing duration of infection the number of CD4 lymphocytes fall. Besides AIDS virus mycobacterium tuberculosis also reduce the CD4 cell count.

This study has demonstrated that the immunosuppressive effect of TB could be improved with antitubercular therapy, as shown in group I, and clearly revealed that CD4+ T cells among some of them could even be lower than 200/mm³ and reversed with the treatment.

In group II, which consisted of 25 HIV-infected patients with active tuberculosis, all of their CD4 + T cell counts were lower than 200/mm³ and fell further even though they received antitubercular drugs. This was contrary to Pozniak's report⁷ in Africa, which suggested that even in HIV infected patients, the immunosuppressive effect of TB could be reversed with anti-TB treatment.

We also found that tuberculous meningitis occurred during the treatment, which was unusual in our experience of non HIV-infected patients. It may be because all of our HIV-infected patients were seriously ill, as shown by the very low CD4 + T cell counts and negative tuberculin test. Our results may be different from other experience and we need a large population to study before offering better conclusion for this deadly disease.

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