A pilot study on CD4 & CD8 cell counts in healthy HIV seronegative pregnant women

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Received July 30, 2002

CD4 and CD8 counts are widely used prognostic markers to assess the degree of immune impairment in HIV seropositive individuals and to monitor anti-retroviral therapy (ART). Pregnancy is considered as a physiologically immunocompromised state, hence alterations in T lymphocyte subsets may occur during pregnancy. There is a need to establish base-line values of these counts, especially in healthy pregnant women. One hundred healthy HIV seronegative pregnant women (mean age 22.5±2.99 yr) in their third trimester of pregnancy and 30 non-pregnant women (mean age 22.7±3.01 yr) were tested for their CD4 and CD8 counts. In pregnant women, the CD4 and CD8 cell counts/µl were 764±249 and 547±196 and the CD4 and CD8 per cent were 56.49±8.3 and 38.03 ± 7.2 respectively. In the non-pregnant women CD4 and CD8 counts/µl were 965 ± 267 and 639 ± 211 whereas the CD4 and CD8 per cent were 55.27 ± 5.99 and 36.17± 6.44 respectively. Absolute counts were significantly lower (P<0.05) in the pregnant group as compared to the controls. A wide variation was seen in the CD4 and CD8 counts in both the groups. However, the variations in the mean CD4 and CD8 per cent were much smaller. Thus CD4 and CD8 per cent may be considered as a useful indicator of immune function rather than absolute counts, in pregnant women.

Key words CD4 counts - CD4 : CD8 - Indian women - pregnancy

Two major subsets of T lymphocytes i.e., CD4 and CD8 cells are frequently used as surrogate markers for the immune suppression associated with HIV infection. They also serve as a guide for prophylactic and therapeutic interventions during the course of this infection1-2. Pregnancy is considered to be a physiologically immunocompromised state. Any alteration in any parameter of the immune system can affect the health of the pregnant woman as well as outcome of pregnancy. CD4 and CD8 counts help in monitoring the prognosis of HIV positive patients on antiretroviral therapy (ART)3. ART is also being used to prevent mother to child transmission of HIV. The immune status of the mother plays an important role in this process. It is thus important to monitor maternal CD4 and CD8 counts as T lymphocyte subset alterations have been documented in the normal pregnant women4-5 and the influence of pregnancy on immunological function is poorly understood. Geographical variation in the CD4 and CD8 counts has also been reported6. It is important to know the base-line levels of CD4 and CD8 counts in normal pregnant women before using these levels as prognostic markers. To the best of our knowledge no studies have been conducted on pregnant women in India, hence a pilot
A study was undertaken to determine the range of CD4 and CD8 counts in HIV seronegative pregnant women. One hundred consecutive HIV seronegative women (aged 22.5±2.99, range 18-30 yr) in the third trimester of pregnancy attending the antenatal clinic of the Sassoon Hospital, Pune during May - July 2001 were included in the study. Thirty HIV seronegative non pregnant women (nurses and hospital staff) (aged 22.7±3.01, range 18-30 yr) were included as controls. Two ELISA tests were used to assess HIV seronegativity. The kits used were MicroElisa (J. Mitra & Co. Ltd., Mumbai, India) and HIV-Chex (Xcyton Diagnostics Ltd., Bangalore, India). Women with a history of any major diseases, complications in pregnancy (previous or present), cough, cold or fever in the past one month were excluded. Blood sample (1 ml) was collected from each woman in a K3 EDTA Vacutainer (Greiner Labortechnik, Austria) between 10:00-12:00 h and kept at room temperature. This was done to avoid any error in subset counts due to diurnal variations. Immunocytometry was done using the FACS Count machine (Becton Dickinson, USA). The Ethics Committee of the institution approved this study. Z test was used to compare the parameters between the two groups. The absolute CD4 and CD8 counts obtained in pregnant women were significantly (P<0.05) lower than those obtained in the non-pregnant women (Table). The mean base-line CD4 and CD8 counts in the pregnant group were 764±249 and 547±196/µl respectively.

Reports on Indian women show varied levels of CD4 and CD8 counts in peripheral blood. Nag et al from Lucknow have reported a mean CD4 count of 798/µl and a CD8 count of 568/µl in non-pregnant women, which were comparable to values in the present study. In south Indian adults mean CD4 and CD8 cell counts of 1048/µl and 595/µl have been reported. Singh et al reported lower values at Manipur. However no specific studies have been conducted on pregnant women in India.

Bisalinkumi et al reported that absolute numbers of CD4+ and CD8+ T-cells as well as total lymphocytes were reduced during pregnancy in African women. While Makrydimas et al reported increased CD4 count and CD4 : CD8 ratio and decreased CD8 counts during pregnancy in British women.

The absolute values obtained in our study are higher than those reported by Burns et al for American women but similar to those reported by Miotti et al in Malawian women. The higher counts in Indian and Malawian women may be due to physiological leucocytosis due to repeated infections.

A wide variation in CD4 and CD8 counts has earlier been reported. In the present study a wide range was observed in the absolute CD4 and CD8 values in both the groups. The mean CD4 and CD8 percentages, however, did not differ significantly in the last trimester of pregnancy and the non-pregnant

### Table. CD4 and CD8 cell counts in the study and control groups

<table>
<thead>
<tr>
<th>Counts</th>
<th>Pregnant women (n=100) (study group)</th>
<th>Non pregnant women (n=30) (control group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4 (counts/µl)</td>
<td>764±249* (250-1776)</td>
<td>965±267 (539-1627)</td>
</tr>
<tr>
<td>CD8 (counts/µl)</td>
<td>547±196* (74-1244)</td>
<td>639±211 (314-1047)</td>
</tr>
<tr>
<td>CD4%</td>
<td>56.49±8.3 (34-76%)</td>
<td>55.27±5.99 (48-68)</td>
</tr>
<tr>
<td>CD8%</td>
<td>38.03±7.2 (23.56%)</td>
<td>36.17±6.44 (27-44)</td>
</tr>
<tr>
<td>CD4/CD8 ratio</td>
<td>1.49±0.53 (0.61-3.38)</td>
<td>1.58±0.39 (0.83-2.54)</td>
</tr>
</tbody>
</table>

*P<0.05 compared to controls
state. Thus the CD4 and CD8 percentages may be better prognostic markers than the absolute counts especially in populations where the base-line values are not available. The findings of the present study though important, are based on small sample size and cannot be generalized. Studies on larger sample size need to be done to confirm these findings.

Acknowledgment

Authors acknowledge the National AIDS Control Organisation for providing the kits and Smt. P.R. Deshmukh for technical assistance. The study was done as a part of ICMR’s Short Term Research Studentship granted to the first author.

References


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