

A retrospective study comprising analysis of CD4 Cell count among HIV infected patients in tertiary care hospital in western India

Raval Payal N¹, Purav G. Patel^{2*}

^{1,2}Assistant Professor, Dept. of Microbiology, GMERS, Gujarat

***Corresponding Author:**

Email: drpurav84@rediffmail.com

Abstract

Introduction: HIV is one of the prevalent infectious disease and major threat to community. As the infection progresses, CD4 count hence, immunity decreases with time. CD4 count plays vital role in prognosis of HIV infection.

Materials and Method: CD4 count reports of total of 109 HIV patients who registered and completed 6 months ART treatment during year 2016 were analyzed in this retrospective study. CD4 cell count was done using Flow Cytometry, FACS count (BD Diagnostic).

Results: Baseline CD4 counts at diagnosis of infection for study group was 190.11 cell/cmm. Among them Male were having baseline value of 182.09 cells/cmm and female were having baseline value of 206.36 cells/cmm. After the initiation of ART there is consistent rise in CD4 count among study group patients.

Conclusion: As the baseline CD4 count is low, patients in high risk group should be encouraged to visit ICTC centre for early detection of HIV. CD4 is mainstay among prognostic marker of HIV infection in India. Also steady intake of ART by HIV patients results in rise in CD4 count, increase in immunity and lowering of viral load.

Keywords: HIV, ART, CD4

Introduction

HIV infects primarily vital cells in the human immune system such as helper T cells (to be specific, CD4+T cells), macrophages, and dendritic cells.⁽¹⁾ CD4 has a significant role in the immune function of T4 lymphocytes and also serves as a marker for that group of cells. Because of the central role of CD4 cells in immune regulation, their depletion can have widespread deleterious effects on the functioning of the immune system as a whole. CD4+ T cells are prime target for HIV virus, so as the HIV infection progresses, the number of these cells declines. CD4 cell count is used to determine how well the immune system is working in people who have been diagnosed with HIV.⁽²⁾ Laboratory markers, such as the HIV-1 RNA viral load and CD4 cell count, are regularly used for patient management in addition to predicting disease progression and/or treatment outcomes. The HIV viral load is considered to be the gold standard for evaluating treatment success, although it is often limited by the cost.⁽³⁾ So in developing country like India, CD4 cell count is considered most appropriate to determine the prognosis and treatment among HIV infected patients. GMERS Medical College Junagadh situated in Saurashthra region of Gujarat. ART center here serves more than 4000 HIV infected patients.

Objective

This is retrospective study done to measure CD4 cell counts in HIV infected adults. This gives information regarding need and urgency of antiretroviral therapy to HIV/AIDS infected people.

Materials and Method

This was a retrospective study on based on data maintained in the CD4 testing centre at GMERS Medical College, Gujarat. Subjects for the study were the reports of HIV patients registered in the ART centre. Reports of total 109 patients who enrolled and completed 6 months of ART, were considered for analysis during year 2016. Patients who died, stopped treatment or transfer to other centre were opted out from the study. Only details regarding age and sex of patients were analysed in this study. Any details revealing patients identity were strictly not taken for analysis. Different parameters like baseline CD4, correlation of CD4 counts with different age group and sex, comparisons of CD4 counts before and after ART treatment, etc were analysed and compared in this study. CD4 cell count was done using Flow Cytometry, FACS count (BD Diagnostic) in the medical college CD4 testing laboratory and values were maintained in the laboratory records. The BD FACSCount™ system is a complete, dedicated system for measuring CD4 absolute counts and percentages or CD4, CD8, and CD3 T-cell counts. For persons infected with HIV, serial measurements of absolute CD4 counts or CD4 percentages are used as an indicator for initiation of antiretroviral therapy, determination of response to therapy, and disease progression.⁽⁴⁾

Results

This study comprise of data of more than 109 HIV positive patients enrolled at ART centre and completed 6 months of ART. Among 109 patients, 73 were male

and 36 were female. Baseline CD4 counts at diagnosis of infection for study group was 190.11 cell/cmm. Among them Male were having baseline value of 182.09 cells/cmm and female were having baseline value of 206.36 cells/cmm. [Table 1]

Age wise distribution of HIV infected patients was also important in this data. Majority of patients belong to age group 14-40 years (67.47%) followed by 40-60 years (31.19%), 0-14 years (6.42%) and >60 years (0.92%). [Table 2]

Total 25.69% (N=28) patients were having baseline CD4 count <100 cell/cmm at the time of diagnosis. Majority of patients 64.22% (N=70) were having baseline CD4 count between 100-350 cells/cmm. Only 11 patients were having CD4 count >350 cells/cmm at the time of diagnosis. [Table 3]

All 109 patients were followed up and CD4 count was repeated after 6 months of initiation of ART. Patients showed significant rise in CD4 count after 6 months. Mean CD4 value for male patients changed to 366.32 cells/cmm which showed 101.17% rise in count. While for female patients, CD4 value changed to 394.05 cells/cmm which showed 90.95% rise in count. Overall baseline CD4 value was 375.48 cells/cmm for whole study group. [Table 1] After completion of 6 months treatment, 53 patients had CD4 count above 350 cells/cmm while only 11 patients were having this value before ART. But on contrast to general result, 4 patients showed decline in CD4 value in after initiation of ART. [Table 3] All this results were recorded in analyzed in standard manner.

Table 1: Baseline value of CD4 count

Study group	No	Baseline (cell/cmm)	After 6 month ART (cells/cmm)	change in %
Male	73	182.09	366.32	101.17
Female	36	206.36	394.05	90.95
Combine	109	190.11	375.48	97.50

Table 2: Age wise distribution of HIV infection

Age Group (yrs)	Male	Female	TG	Total
<14	4	3	0	7
14-40	44	23	0	67
40-60	24	10	0	34
>60	1	0	0	1

Table 3: Difference in baseline Value of CD4 count among all Patients

CD4 Count (cells/cmm)	Pre ART		6 months after ART	
	No. of pts	%	No. of pts	%
<100	28	25.69	4	3.67
100-350	70	64.22	52	47.71
350-500	10	9.17	25	22.94
>500	1	0.92	28	25.69
Total	109	100	109	100

Discussion

As per the recently released, India HIV Estimation 2015 report, National adult (15-49 years) HIV prevalence in India is estimated at 0.26% (0.22% - 0.32%) in 2015.⁽⁵⁾ One of the many problems in deciding when to start and how to monitor patients on ART is the unavailability and cost of laboratory tests, including CD4 counts and viral load, which are readily available in developed countries. Since viral-load testing is costly and not widely available, NACO has decided to use absolute CD4 count at as the basis of initiation and monitoring of ART.⁽⁶⁾ CD4 count is direct parameter to measure cell mediated immunity to human being. As the HIV infection progresses value of CD4 count decreases. Now NACO recommends to start ART in all HIV infected patients irrespective of CD4 count.⁽⁷⁾

In this study baseline CD4 was 190.11 cell/cmm for whole study group, which is far less than normal healthy individual. As lack of knowledge and ignorance, HIV infection remains undiagnosed at earlier stage even after history of exposure. Because of this at the time of diagnosis patients having increased viral load resulting in low CD4 count. Base line value of our study is in accordance with another study of vanisri H R et al, having base line of 135.04 cells/cmm which is also far less than normal healthy individual.⁽⁸⁾

Among all age groups, patients between 14-40 years were most in number (N=67) followed by 40-60 years (N=34), 0-14 years (N=7) and >60 years (N=1). This may be due to higher chance of exposure in young and middle age group to HIV virus. Total 7 patients were in pediatric age group. Patients showed significant rise in CD4 count after 6 months. Mean CD4 value for

male patients changed to 366.32 cells/cmm which showed 101.17% rise in count. While for female patients, CD4 value changed to 394.05 cells/cmm which showed 90.95% rise in count. Overall baseline CD4 value was 375.48 cells/cmm for whole study group. This is also in accordance with study of vanisri H R et al. Despite on ART treatment 4 patients showed decline in CD4 count which may be due to non compliance to treatment or resistant to ART drug. There was difference in baseline value in male and female patients. Also number of male patients was more in the study group. But after treatment there was consistent rise in value of CD4 count in both male and female age group. This shows good response to ART during course of treatment.

Conclusion

Baseline CD4 counts was low at the time of diagnosis of HIV infection in this study. This shows negligence or little awareness of the patients towards HIV particularly in high risk group. Individual with high risk group should be encouraged to visit ICTC centre so it can be possible to diagnose HIV in early stage so that it will help to minimize spread of HIV among community. Awareness regarding HIV among people in developing countries like India is quite necessary. NACO is doing excellent work in direction of awareness, detection and management of HIV infection. But still in most peripheral area HIV infection remains undiagnosed till progression of HIV infection. Also education about the importance of continuous intake of antiretroviral therapy among HIV patients, is must which will increase survival and minimize the viral load and hence transmission of the disease. ART is effective in slowing the progression of HIV infection and increase the survival of HIV infected patients.

References

1. Cunningham A, Donaghy H, Harman A, Kim M, Turville S. Manipulation of dendritic cell function by viruses. *Curr Opin Microbiol.* 2010;13(4):524e529. <http://dx.doi.org/10.1016/j.mib.2010.06.002>. PMID 20598938.
2. Ogg GS, Jin X, Bonhoeffer S, Dunbar PR, Nowak MA, Monard S, et al. Quantitation of HIV-1- specific cytotoxic T lymphocytes and plasma load of viral RNA. *Science* 1998; 279: 2103-6.
3. Jennifer Hoffman, Johan van Griensven, Robert Colebunders & Mehri McKellar; 10.2217/HIV.09.58 © 2010 Future Medicine Ltd; *HIV Ther.* (2010) 4(1), 27–39.
4. BD FACS Count System; <https://www.bdbiosciences.com/us/instruments/clinical/ce ll-analyzers/bd-facscount/m/744703/overview>.
5. <http://naco.gov.in/hiv-facts-figures>; HIV Facts & Figures.
6. ART guideline for HIV infected adults and adolescents; NACO 2013.
7. No. T 11020/86/2006 NACO (ART); MOHFW GOI; Dt 5th May, 2017.
8. Vanisri H R, Vadiraja N; CD4 Cell Count Analysis Among HIV Patients at a Tertiary Hospital in South India; *Annals of Pathology and Laboratory Medicine*, Vol. 03, No. 02, April - June 2016.

How to cite this article: Payal RN, Patel PG. A retrospective study comprising analysis of CD4 Cell count among HIV infected patients in tertiary care hospital in western India. *Indian J Microbiol Res* 2017;4(4):431-433.