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Physiology

EFFECT OF ANTE RETROVIRAL THERAPY ON CD4 COUNT IN PEOPLE LIVING WITH HIV/AIDS

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ABSTRACT The most important immune marker in the HIV infection or AIDS is CD4+T Lymphocyte (CD4).CD4 cells are the most important element of the cell mediated immunity in human being. 'Highly Active Ant Retroviral Therapy' (HAART) or ART has changed the HIV/AIDS from a 'virtual death sentence' to a 'chronic manageable disease' Aim and Objectives: Aim of our study to find the effect of ART on immunity status particularly on CD4 count in PLWH on ART as compare to those who are not on ART. Materials and Methods: Two hundred PLWH of age group 18-60 years were included in the study Study conducted at tertiary care hospital and medical teaching institute in India. CD4 count is carried out by flow cytometry. CD4 count done on Partec ™ cyflow counter Germany. Results: The results of study found 40.11% of the subjects on ART had CD4 count > 500 as compared to only 21.22% of subjects who were not on ART. Significant relation in ART and CD4 count observed (p=0.001).Conclusions: ART increase CD4 count in PLWH increasing immunity and improving health.

KEYWORDS : ART,CD4 ,HIV/AIDS, PEOPLE LIVINGWITH HIV/AIDS

INTRODUCTION

HIV infection has been reported to cause diverse degree of immunopathogenesis in people living with HIV and this carries enormous hematological and biochemical consequences Progression of HIV infection is associated with substantial depletion in the level of CD4 T-cells count [1].

'Highly Active Ant Retroviral Therapy' (HAART) or ART has changed the HIV/AIDS from a 'virtual death sentence' to a 'chronic manageable disease'. The first drug effective against HIV, Zidovudine (AZT, ZDV) was approved as early as 1986. Antiretroviral therapy not only prevents AIDS-related illness and death: it also has the potential to significantly reduce the risk of HIV transmission and the spread of tuberculosis. From 1996 to 2012, antiretroviral therapy averted 6.3 million AIDS-related deaths worldwide, including 5.2 million deaths in low- and middle-income countries [2,3].

Nearly three decades from starting of ART and early periods of different guidelines for starting ART by different agency like US Department of health and human services(DHSS), British HIV Association (BHIVA), and early guidelines by WHO itself were vague and lack uniformity.[4,5,6,] With its "treat-all" recommendation, WHO removes all limitations on eligibility for ART among people living with HIV; all populations and age groups are now eligible for treatment, including pregnant women and children [7].

Antiretroviral Therapy (ART) clinics were started in 2004 by the Government of India, however, there are very few published reports regarding the efficacy of the Highly Active Antiretroviral Therapy (HAART) regimens that are being used in India based on monitoring of clinical and immunological response [8,9].

Since very few studies and less data is available on the effect of ART on CD4 count in Indian population. So we aimed to obtain the baseline data for Indian population and study effect of ART on CD4 count in India.

MATERIALS AND METHODS

STUDY AREA AND DESIGN

This study was conducted at tertiary care hospital and teaching institute situated in India. This study was descriptive cross-sectional study. All the subjects of both sex were people living with HIV (PLWH) who were diagnosed cases of HIV infection at various ICTC center under NACO supervision including present institute.

INCLUSION CRITERIA

HIV infection diagnosed Subjects both male and female of age between 18-60 years were selected. Subjects who have given the written informed consent were included in study.

EXCLUSION CRITERIA

Subjects below 18 years and above 60 years, subjects with known hematological disorders like sickle cell anemia thalassemia, hemophilia etc. subjects with history of resent blood transfusion female subject with ANC care and subjects with terminal illness. Subjects who have not given the written informed consent excluded from study.

SAMPLE COLLECTION

After obtaining written informed consent all the subjects were thoroughly examined for general and systemic examination. Socio-demographic variable and patient history was collected through structured questionnaire. With the subjects sitting comfortably on chair with all aseptic precaution 5 ml venous blood collected from ante cubital vein in EDTA bulb. All the samples were collected between 9:00 a.m.to 12:00 p.m. All the samples were analyzed within two hours of sample collection.

INVESTIGATION

CD4 count carried out by flow cytometry. CD4 count done on Partec ™ cyflow counter Germany as per the guidelines provided by the manufacturer.

Normal range: 500cells/µl - 1500 cells/µl

CD4 is the most important biological marker for assessment of immune status of PLWH.CD4 count < 200/ µl or < 14% is AIDS defining illness. CD4 count classified according to center for disease control and prevention (CDC) classification [10].

- Category 1. CD4 ≥ 500 cells/µl
- Category 2. CD4 200 -499 cells/µl
- Category 3. CD4 < 200 cells/µl

DATA ANALYSIS

Data analysis was carried out using Statistical Package for Social Science (SPSS) version 16.0. p value < 0.05 considered as significant and p value > 0.05 non-significant.

ETHICAL CONSIDERATION

Present study was part of research work "Study of some hematological parameter changes in people living with HIV/AIDS" and approved by the local ethical committee of institute via letter No/Pharm/IEC/ Approv letter 598/11.

RESULT AND OBSERVATIONS

Table no.1 shows socio-demographic variables in the study. Table no.2 shows the CD4 count according to sex. Only 74 subjects i.e. 37% of all two hundred subjects have normal CD4 count showing no immunosuppression. In male 32(32.32%) and in female 42(42.58%) subjects were in category 1. Female shows high prevalence of normal CD4 count. Out of two hundred nineteen i.e. 9.5% subjects have CD4 count below 200 cells/ µL. No significant relation in CD4 count and sex found (p=0.255).

Table no.3 shows CD4 count according to ART status. In subjects on ART 67(40.11%) and in subjects not on ART 7(21.22%) subjects were in category1. In subjects on ART 10(5.98%) and those not on ART 9(27.27%) subjects were in category 3. Non- ART subjects shows more subjects in category 3 as compare to ART. Significant relation found in CD4 and ART status (p=0.001). PLWH on ART shows high CD4 count as compare to those without ART.

TABLE NO.1. SOCIO-DEMOGRAPHIC VARIABLES (N=200)

SOCIO-DEMOGRAPHIC VARIABLE	NO.OF SUBJECT	
SEX	MALE	99(49.5%)
	FEMALE	101(50.5%)
ART	YES	167(83.5%)
	NO	33(16.5%)
CDC CATEGORY	1.≥500 cells/µl	74(37%)
	2.200-499cells/µl	107(53.5%)
	3.< 200 cells/µl	19(9.5%)

TABLE NO2. CD4 ACCORDING TO SEX

PARAMETER		MALE (N=99) (%)	FEMALE (N=101) (%)	Chi-square	P
CD4	≥ 500	32(32.32)	42(41.58)		
	200-499	52(52.52)	55(54.45)	2.73	0.25
	< 200	12(12.12)	7(6.93)		

TABLE NO. 3. CD4 ACCORDING TO ART NON ART

PARAMETER		ART (N=167) (%)	NON ART (N=33) (%)	Chi-square	P
CD4	≥ 500	67(40.11)	7(21.22)		
	200-499	90(53.89)	17(61.51)	15.53	0.001*
	< 200	10(5.91)	9(27.27)		

DISCUSSION

Present study was done at tertiary care hospital and teaching institute in India. Two hundred people living with HIV/AIDS were recruited for study. Study was aimed to find the effect of ART treatment on CD4 count in PLWH.

In present study 63% subjects had CD4 count less than 500 cells/ µl. Similar observations showing low CD4 count are shown by Daniel et al observed 91(61.1%) subjects having low CD4 count, Pande et al found mean CD4 188 cells/µl, Dapper et al observed CD4 count is highest in sero-negative subject and lowest in AIDS subject and intermediate in HIV seropositive subjects[11,12,13].

In present study we observed increased CD4 count in subjects on ART similar results observed by Amegor OF et al he found that the use of antiretroviral drugs therapy increase CD4 count and thus has the ability to boost the immune system of the body amidst the reported side effects. The ability of the drugs boosting the immune system seems to override the reported side effects and encourage the management of HIV/AIDS patients with antiretroviral drugs despite the side effects [14].M. M. Abduljalil et al also observed similar results with present study all the HIV positive patient groups have significantly (P<0.05) lower levels of CD4 T-cells compared to the HIV negative subjects (control). The CD4 T-cells levels increased in those on treatment for 7-12 months compared to other two HIV positive groups, though the increase is not statistically significant [15].

In present study CD4 shows significant relation with ART and non-ART group p=0.001.Similar significant relation between ART and CD4 count observed by Nikolas et al. who showed a strong relationship between CD4 cell count of HIV positive subjects on HAART and HAART naive subjects. Denue et al observed mean CD4 count was significantly higher in HAART-experienced than in HAART naive participants (P < 0.001) . The risk of immunological AIDS (< 200 cell/µL) was 3 times in HAART naive than HAART experienced (P < 0.001). From his study he concluded that HAART has the capability of reducing the incidence of anemia, other deranged hematological and immunological parameters associated with disease progression, and death in HIV infected patients [16].

CONCLUSION

This study highlights the positive impact of ART on CD4 count in Indian population. This study also provides baseline data for the future study on effect of ART on CD4 count as well as immunity in PLWH. Result of the study strongly supports new policy 'Treat-All' by WHO for the early commencement of ART in PLWH.

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None

CONFLICT OF INTEREST

None

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