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Research Article

Clinical Profile and Response to First-Line Antiretroviral therapy in HIV Patients from Punjab: A Retrospective Study

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ABSTRACT

Objective: The objective of the study was to evaluate the immune recovery among HIV infected patients on Antiretroviral therapy at one year follow-up.

Methodology: The study was a retrospective analysis of patients on Antiretroviral therapy referred by different Voluntary Counselling and Testing (VTC), centers between February, 2014 and January 2015 at HIV CENTRE TEACHING HOSPITAL DG KHAN, Punjab. Adult patients greater than 18 years of age with CD4 count <350 cells/mm^3 or who are WHO clinical stage III or IV were considered eligible for ART and included.

Results: Among 800 patients, majority, (73.40%) were males and had no travel history (59.24%). Majority (58.86%) of patients were of stage IV, followed by stage III (23.63%). More than fifty percent of patients (410/800) had reported heterosexual contact as risk factor for HIV infection. There was significant increase in CD4 cell count at follow-up compared to baseline (183.27 ± 24.56 Vs. 308.79 ± 36.23; p-value). Similarly, the viral load among patients on Antiretroviral therapy significantly reduces as a result of therapy at six months ($2.98 \times 10^4 \pm 138.76$ Vs. $1.54 \times 10^4 \pm 127.63$; p-value = 0.001).

Conclusion: The study concluded that as a result of Antiretroviral therapy CD4 cell count increases and viral load decreases significantly. Thus long term combined Antiretroviral therapy could possibly improve and restore the immune status of HIV infected patients.

Keywords: Antiretroviral therapy, ART, CD4, HIV, viral load

INTRODUCTION

Antiretroviral therapy provision is an indispensible component of HIV epidemic response in countries with limited resources. Recently, with increasing number of patients receiving ART, a significant reduction in the AIDS related mortality has been documented.[1] In Pakistan, the HIV epidemic has evolved from the state of low prevalence to a concentrated epidemic. The prevalence of HIV in the country was reported as less than 1%, with an estimated 100,000 cases.[2] Up to last decade, Pakistanis being deported from Gulf countries was the single largest group infected with HIV with low prevalence among high risk groups.[3] However

recent surveillance data from Pakistan indicated that infection rate is rising among injecting drug users, transvestite/transsexual sex workers and men having sex with men.[2]

Antiretroviral therapy works by stopping viral replication. Different classes of antiretroviral drugs are available i.e. Nucleoside reverse transcriptase inhibitors, Non nucleoside reverse transcriptase inhibitors and protein inhibitors. Antiretroviral first line regimen included zidovudine(AZT), lamivudine, stavudine (d4T), nevirapine (NVP) andefavirenz (EFV) while tenofovir, didanosine and lopinavir/ritonavir are introduced as second line regimen.[2]The availability of these regimens has changed HIV from a fatal disease to a chronic illness with life-long suppression of HIV replication.[4] There are few studies which have investigated the immune recovery as a result of ART use. Most of these studies reporting clinical, virological and immunological response to ART among HIV infected patients were from developed countries where ART was initiated at relatively high CD4 count. Data on immune recovery among HIV infected patients from Pakistan is limited. The study was conducted to describe HIV infected patients started on ART in clinics of Punjab. Moreover, the study also aimed to determine the immune recovery among HIV infected patients on Antiretroviral therapy.

MATERIAL AND METHODS

This was a retrospective study conducted between February, 2014 and January 2015 at HIV CENTRE TEACHING HOSPITAL DG KHAN, Punjab. The HIV infected patients at the Facility were referred by different Voluntary Counselling and Testing (VTC), centers located at different districts of province of Punjab. The hospital provides care to approximately(1500) patients with (873) are on ART. In this study, adult patients greater than 18 years of age, visited Facility, and were placed on ART therapy between the study period were included. Patients who have a CD4 count <350 cells/mm3 or who are WHO clinical stage III or IV were considered eligible for ART and included. Patients with critical illness and concurrent infections were excluded.

Patient's received ART according to national guidelines.[5]Two NRTI and one NNRTI regimen were used as a first line therapy. Two regimens were used; Zidovudine + Lamivudine as an NRTI and Nevirapine (Efavirenz in patient on anti-tubercular treatment) and Stavudine + lamivudine as an NRTI and Nevirapine (Efavirenz in patient on anti-tubercular treatment). Haemoglobin value of 8 gm/dl was taken as cut off for anaemia and anaemic patients were placed on stavudine based regimen.

Data was recorded on a structured questionnaire. Patient's demographic details (i.e. age, gender, occupation, education), travel history, risk factors for HIV, WHO clinical staging of HIV disease and treatment regimen for ART were collected. Baseline data of CD4 lymphocyte counts and hemoglobin at the time of ART initiation were retrieved from patient's record. Patients were followed for one year and CD4 count at one year follow-up was also recorded.

Written informed consent was obtained from all the patients prior to enrollment in the study. Anonymity and confidentiality of patient's data and records was maintained throughout the research. This study was approved by ethical review committee of the hospital.

Data Analysis

Data was analyzed using IBM SPSS Statistics for Windows, Version 20. Descriptive statistics were performed. Quantitative variables were presented using mean (SD) and categorical variables were summarized using frequency and percentage. The outcome of interest was increase in CD4 cell count. CD4 cell count at baseline and end of follow-up (at one year) were compared using paired t-test. The statistical significance was set at p-value < 0.05.

RESULTS

In this retrospective analysis, a total of eight hundred patients gave informed consent and were included in the study after satisfying the inclusion

and exclusion criteria. Among 800 patients, majority, about 73.40% (587) were males. Around sixty percent of patients had no travel history. Over 64% (512/800) of patients had either a primary level of education or lower, and around 46% (369/800) were professionals or skilled. More than fifty percent of patients (410/800) had reported heterosexual contact as risk factor for HIV infection. Majority (58.86%) of patients were of stage IV, followed by stage III (23.63%).The table 1 gives details for demographics, risk factor for HIV infection and WHO clinical stage of HIV at initial presentation of HIV infected patients who received antiretroviral therapy.

Of the 800 patients, 64 (8%) expired during the one year follow-up period. There were 110 (13.75%) patients who were lost to follow-up. Therefore, a total of 626 (78.25%) were still on Antiretroviral therapy at end of study period (one year follow-up). Figure 1 gives details of status of patient at one year follow-up.

The CD4 lymphocyte cell count and viral load at baseline and six months follow-up were compared. There was significant difference in both parameters. There was significant increase in CD4 cell count compared to baseline (183.27 ± 24.56 Vs. 308.79 ± 36.23; p-value). Moreover, the viral load among patients on Antiretroviral therapy significantly reduces as a result of therapy at six months ($2.98 \times 10^4 \pm 138.76$ Vs. $1.54 \times 10^4 \pm 127.63$; p-value = 0.001). The results were shown in Table 2.

Table 1: Demographics, Risk factors for HIV and WHO Clinical stage of HIV

Baseline Characteristics	**n (%) OR Mean ± SD**
Gender	
Male	587 (73.40)
Female	213 (26.60)
Age (years)	32.65 ± 9.2
Travel History	
Travelled out of Pakistan	257 (32.13)
No travel history for self but spouse travelled	69 (8.63)
No travel history for self or spouse	474 (59.24)
Occupation	
Skilled	170 (21.25)
Unskilled	182 (22.73)
Professionals	199 (24.88)
Housewives	123 (15.38)
Transgender sex workers	17 (2.13)
Others (including unknown)	109 (13.63)
Education	
Illiterate	288 (36.0)
Primary	141 (17.63)
Secondary	228 (28.5)
College	143 (17.87)
Risk factor for HIV exposure	
Heterosexual Contact	410 (51.25)
Male homosexual/ bisexual contact	110 (13.75)
Injecting drug use	195 (24.38)
Blood products	41 (5.13)
Unknown	44 (4.49)
WHO clinical staging of HIV disease at presentation	
Stage I	83 (10.38)
Stage II	57 (7.13)
Stage III	189 (23.63)
Stage IV	471 (58.86)

Figure 1: Status at One year Follow-up

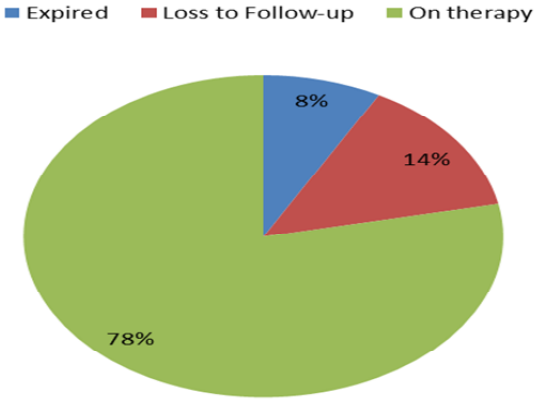

Table 2: Comparison of CD4 and Viral load among HIV infected patients on Antiretroviral therapy at baseline and six follow-up

CD4 and Viral Load	Baseline (Mean ± SD)	Six Month Follow-up (Mean ± SD)	P-value
CD4 (cell/mm^3)	183.27 ± 24.56	308.79 ± 36.23	0.001
Viral load	2.98 x 10^4 ± 138.76	1.54 x 10^4 ± 127.63	0.001

DISCUSSION

The results of the study conducted identified that there was a significant increase in CD4 cell count and a substantial decrease in viral load among HIV patients on antiretroviral therapy. The mean CD4 T-cell count at six month follow-up was significantly higher as compared to baseline. Moreover, the mean viral load at follow-up was significantly lower than it was at baseline assessment.

The findings of the study conducted are relatable to previous studies. It has been reported that antiretroviral therapy has improved impact on laboratory markers of disease progression.[6] Early initiation of the ART therapy would be beneficial in reducing the severity of acute disease, decrease viral mutation rate and alter earlier viral set point. Importantly, the viral replication suppression will not only improve the immune function but also decrease viral transmission risk during the high the high infectivity stage of HIV.[6]The viral suppression for the prolonged period has been found associated with in CD4 T-lymphocyte count and decrease in the opportunistic infection rate, which subsequently decreases both morbidity and mortality.[6]

The mean CD4 cell count at follow-up was slightly lower compared to previous studies.[7-8]The study conducted in Western Ethiopia reported that CD4 T lymphocytes showed significant improvement at two years follow-up among HIV patients on combined antiretroviral therapy.[9]The use of antiretroviral therapy for 2-4 years have shown the mean CD4 cell count rise approximately in the range of 200-300 cell/ µl, with the rate of CD4 increase diminishing over time.[10-11] The recent study from Tanzania reported that among 171 patients enrolled more ninety percent had increment in their CD4 cell count with a median increase of more than 150 cell/ µl compared to baseline.[12]The only study found published from Pakistan also showed comparable findings.[13] The study highlighted that significant improvement in both viral load and CD4 cell count was observed at follow-up when HIV patients were placed on combine antiretroviral therapy (Tenofovir – Lamivudine – Efavirenz). The mean viral load pre treatment and follow-up was 3.22 x 10^4 and 1.61 x 10^4 respectively.Similarly, the mean CD4 cell count at baseline and follow-up also showed significant improvement with mean rise of 200 cell/ µl.

The immune response has described in the literature to be influenced by a number of factors. The baseline CD4 cell count is associated with immunological outcomes. Patients with low baseline CD4 cell count initiating the combined antiretroviral therapy have shown poor immune response at follow-up.[14] Moreover, younger

patients have been described to have a better immunological outcomes compared to elderly.[14] In the present study the men age of the study participant was 32 years. With advancing age thymic function reduces. The HIV patients in this study represent a younger age group, thus a better immune response can be accounted for this apparently younger population.

The study has few limitations. As the study design was retrospective which has its own limitations i.e. incomplete documentations, missing values and non uniformity in the time interval between viral load and CD4 T cell lymphocytes cell count. Moreover, the follow-up period in this study was six months where CD4 cell count and viral load was determined. A longer and multiple follow-up periods with assessments would have been more revealing and should helped in immune recovery trend. Nevertheless, the study was useful in generating the much useful information related to Antiretroviral therapy in the province of Punjab. The results of the current study will be useful in generating hypothesis for future prospective studies on evaluating immune response and identifying factors related to CD4 T cell lymphocytes recovery among HIV patients initiated on Antiretroviral therapy.

CONCLUSION

The study concluded that majority of patients in most densely populated province of Pakistan, like other resource limited settings are diagnosed at very low CD4 cell count. However, early diagnosis and initiation of Antiretroviral therapy could possibly restore the immune status of HIV infected patients.

REFERENCES

1. Bartlett JA, Shao JF. Successes, challenges, and limitations of current antiretroviral therapy in low-income and middle-income countries. Lancet Infect Dis 2009;9(10):637-649.
2. Baqi S, Abro AG, Salahuddin N, Ashraf Memon M, Qamar Abbas S, Baig-Ansari N. Four years of experience with antiretroviral therapy in adult patients in Karachi, Sindh, Pakistan. Int Health 2012;4(4):260-267.
3. Shah SA, Khan OA, Kristensen S, Vermund SH. HIV-infected workers deported from the Gulf States: Impact on Southern Pakistan. Int J STD AIDS 1999;10(12):812-814.
4. Volberding PA, Deeks SG. Antiretroviral therapy and management of HIV infection. Lancet 2010;376(9734):49-62.
5. Government of Pakistan. National guidelines for antiretroviral therapy. Islamabad, Pakistan: National AIDS Control Program; 2005.
6. Mehandru S, Poles MA, Tenner-Racz K, Horowitz A, Hurley A, Hogan C, et al. Primary HIV-1 infection is associated with preferential depletion of CD4+ T lymphocytes from effector sites in the gastrointestinal tract. J Exp Med 2004;200(6):761-770.
7. Kaufmann GR, Bloch M, Finlayson R, Zaunders J, Smith D, Cooper DA. The extent of HIV-1-related immunodeficiency and age predict the long-term CD4 T lymphocyte response to potent antiretroviral therapy. AIDS 2002;16(3):359-367.
8. Kaufmann GR, Furrer H, Ledergerber B, Perrin L, Opravil M, Vernazza P, et al. Characteristics, determinants, and clinical relevance of CD4 T cell recovery to <500 cells/μL in HIV type 1-infected individuals receiving potent antiretroviral therapy. Clin Infect Dis 2005;41(3):361-372.
9. Wabe NT, Alemu M. Immunological and clinical progress of HIV-infected patients on highly active antiretroviral therapy in north west Ethiopia. Gazian Med J. 2012;18(1):31-36.
10. Smith CJ, Sabin CA, Lampe FC, Kinloch-De-Loes S, Gumley H, Carroll A, et al. The potential for CD4 cell increases in HIV-positive individuals who control viraemia with highly active antiretroviral therapy. AIDS 2003;17(7):963-969.

11. Moore RD, Keruly JC. CD4+ cell count 6 years after commencement of highly active antiretroviral therapy in persons with sustained virologic suppression. Clin Infect Dis 2007;44(3):441-446.
12. Mpondo BCT, Kabangila R, Ephraim L, Ernest A, Kidenya BR. Immune recovery among HIV-infected patients in northwestern tanzania after 2 years of anti-retroviral therapy use: A retrospective cohort study. Tanzan J Health Res 2015;17(4).
13. Tariq N, Mansur G, Shoukat H, Malik A, Manan A, Qazi MH. Inter-relationship of viral load and CD4+ cells in patients suffering from acquired immuno deficiency syndrome (AIDS): Update from Punjab, Pakistan. Med Forum Monthly 2014;25(11):80-82.
14. Kanters S, Nachega J, Funk A, Mukasa B, Montaner JSG, Ford N, et al. CD4+ T-cell recovery after initiation of antiretroviral therapy in a resource-limited setting: A prospective cohort analysis. Antiviral Ther 2014;19(1):31-39.