ISSN 0976 – 3333

Available Online at www.ijpba.info

International Journal of Pharmaceutical & Biological Archives 2014; 5(5): 130 - 134

RESEARCH ARTICLE

Changes in the CD4 Counts in HIV Infected Patients in and Around Salem District, Tamilnadu, India

S. Sathiyavathi and K. Pugazhendy*

Department of Zoology, Annamalai University, Annamalai Nagar – 608 002, Tamilnadu, India

Received 07 Jun 2014; Revised 03 Oct 2014; Accepted 14 Oct 2014

ABSTRACT

The progressive depletion of CD+ lymphoytes is the cardinal event in the pathogenesis during the infection by human immunodeficiency virus. The absolute number of these CD4+ T cells in the peripheral blood is the single most important parameter formonitoring the disease associated with HIV infection. CD4+T cell enumeration is essential in three areas. First, CD4 counts are used to asse ss, The degree of immune deterioration as a surrogate marker for HIV induced damage and repeated CD4 tests define a decline slope of CD4 counts as an indication of the speed of progression towards Acquired Immuno Deficiency Syndrome (AIDS) , with the help of baseline CD4 counts , patients are placed for appropritate timing of starting antiretro viral therapy (ART) and to define the starting point for efficient prophylaxis against opportunistic infection . Secondly, while on therapy, improvement in CD4 counts is indicative of the efficacy of ART. Finally, epidermiological AIDS surveillance is based on CD4 counts to help define an anticipated welfare and health care needed. The successful ART is associated with potent suppression of HIV replication as measured by falling HIV/AIDS viralload and improvement in immune function with increased CD4+ lymphocyte numbers. Both previously sequestered memory CD4+ cells and naïve lymphocytes areinvolved in the immune reconstruction.

Key words: HIV, ART, CD4+ cells.

---

1. INTRODUCTION

The acquired immune deficiency syndrome (AIDS) is caused by the human immunodeficiency virus (HIV). HIV-1 was initially identified by Luc Montanier at the Institute Pasteur, Paris, in 1983 and was then more fully characterized in 1984 by Robert Gallo in Washington and Jay Levy in San Francisco. A second virus, HIV-2, was isolated from West African patients in 1986. Since its discovery almost 70 million people have been infected with the HIV virus and about 35 million people have died of AIDS. An estimated 0.8% of adults aged 15-49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions. Sub-Saharan Africa remains most severely affected, with nearly 1 in every 20 adults (4.9%) living with HIV and accounting for 69% of the people living with HIV worldwide.

The first case of HIV/AIDS was reported in India in Tamil Nadu in 1986. Since then the virus has spread from the high-risk groups to the general population very fast.The total number of people living with HIV/AIDS (PLHA) in India is estimated at 23.9 lakh (19.3 – 30.4 lakh) in 2009.India has the third largest number of people living with HIV/AIDS. As per the 2008-09 HIV estimates, there are an estimated 23.9 lakh people currently living with HIV/AIDS (Acquired Immunodeficiency Syndrome) in India with an adult prevalence of 0.31 percent in 2009.

A HIV positive person co-infected with MTB has 50-60% life time risk of developing TB disease, as compared to an HIV negative person who has a 10% life-time risk of developing TB disease.Thus TB mortality could well be influenced by the MTB/HIV co-infection. Despite the existence of affordable medications, too few people living with both HIV and tuberculosis are receiving treatment for both conditions. This situation contributes to

***Corresponding Author:** K Pugazhendy, **Email:** pugalendy@rediffmail.com

substantial, avoidable morbidity and mortality. In tuberculosis patients without HIV infection, tuberculosis patients who are living with HIV have lower treatment success rates, primarily due to an increased risk of death.

2. MATERIALS AND METHODS

STUDY AREA

Salem was the largest district of Tamil Nadu before it was bifurcated into two administrative districts viz. Salem and Dharmapuri districts. Again it was divided to form Namakkal District. Salem is a city and a corporation in Salem district in the Indian state of Tamil Nadu. Located in the north central part of the southernmost state of India, it is the fifth-largest city of Tamil Nadu, after Chennai, Madurai, Coimbatore and Trichy. Almost completely surrounded by hills, Salem is also a part of the Kongu Nadu (Coimbatore and Erode) region. Salem is at the base of the renowned tourist destination of Yercaud hills. The city is surrounded by a natural amphitheatre of hills formed by the Nagaramalai to the north, the Jeragamalai to the south, the Kanjanamalai to the west, and Godumalai to the east. It is divided by the Thirumanimuthar in the main division. Salem is a Geologist's paradise, surrounded by hills and the landscape dotted with hillocks.

Salem is a transit point for travel between Chennai, Bangalore, Thiruvananthapuram, Coimbatore, Madurai, Ernakulam, Cochin, Pondicherry, Trichy, Kanniyakumari and other comparison to places. National Highway 68 or NH 68 runs between Ulundurpettai and Salem in the Indian state of Tamil Nadu for a total of 134 km (80 miles). It connects with NH 7 and NH 47 at Salem. NH 68 connects NH45 and SH 69 at Ulundurpettai. National Highway 47, commonly referred to as NH 47, is a busy highway that runs through some parts of Tamil Nadu and the south-west coast of Kerala state in India. The highway touches the cities of Salem, National Highway 7, commonly referred to as NH 7, is a busy highway that runs through of Uttar Pradesh, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, and Tamil Nadu state in India. The road is a part of National Highway network of India, and it is officially listed as running over 2369 km from Varanasi to Kanyakumari. It is the longest national highway in India.

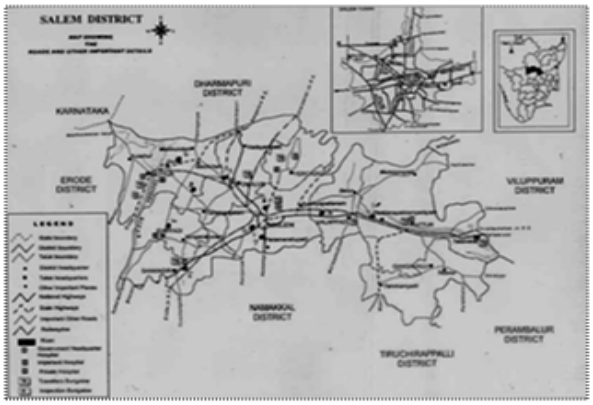

Fig 1: Map showing at Salem district Tamil Nadu, India

3. RESULTS AND DISCUSSION

A total of 100 samples were carried out for our research before and after ART treatment were given in (**Table 2**).The patients testing HIV-positive in after treatment had a higher frequency of WHO Stage 1 disease and CD4 counts above 350 cells/mL, and were more likely to be males than patients in before treatment. More patients in after ART received clinical staging patients with WHO Stage 4 disease were eligible for ART regardless of their CD4 count and were excluded from the rest of the analysis.

In the present study an antibody HIV2 before ART treatment CD4 cell count was lower (111) and after treatment CD4 cell count was 196 in 91th patient. An antibody HIV1 before treatment the highest CD4 cell count was 411 in 10th and 77 patients, after ART treatment in 10th patients CD4 cell count was increased to 520 and in 77th patient the count was 975.

This is one of the first assessments of pre-treatment losses to care amongst HIV-positive youth, and the first assessment of POC CD4 testing on the uptake of ART in this population group. In summary, significantly more patients received their CD4 count test result and had their ART eligibility assessed following the implementation of POC CD4 testing. Loss to follow-up was high in both groups, with half of the eligible patients in each of the groups lost from care prior to ART initiation, the majority prior to starting ART preparation counselling. There was an improvement in the proportion initiating ART after the introduction of POC CD4 testing; however, this was not significant. In both groups, a similar proportion of eligible patients started and completed ART preparation counselling sessions. There was an eight-day reduction in the time from HIV testing to ART initiation in Group B, but this reduction was not statistically significant. POC CD4 testing did result in a two-week reduction in time from HIV-testing to ART eligibility assessment. Two previous studies, in Mozambique and South

Africa, have shown that the use of POC CD4 testing in primary care facilities reduced the overall attrition prior to ART initiation and reduced time to ART initiation [1]. Similar to our findings, the study in Mozambique showed no difference in the proportion of patients lost to follow-up between ART eligibility and ART initiation. In particular, results from the Mozambique study for those aged 15-29 years showed that 54% of patients in total were lost from care between clinic enrolment up to ART initiation, findings similar to those obtained in our study. The study in South Africa also found those aged 19-25 years were more likely to be lost from care prior to initiation of ART compared with older age groups.

Two systematic reviews on retention in care from HIV-testing to ART initiation in sub-Saharan Africa found that of those eligible for ART, only two-thirds initiated ART. These reviews included studies which considered all eligible patients or an adult-only population. By comparison, our findings suggest that youth experience even higher attrition prior to ART initiation. While there was an increase in ART uptake following the introduction of POC CD4 testing, this was not statistically significant. This study shows that the HIV-positive youth have is high attrition prior to initiating ART, warranting further research into simplifying and reducing the lengthy ART initiation process. Therefore, further qualitative research to beexplore the reasons for such high attrition among youth prior to commencing ART is needed. At the same time when laboratory CD4 testing methods were used, the two-week period between HIV testing and receiving CD4 count results left newly diagnosed HIV-positive patients who failed to return for follow-up care with an uncertain prognosis.

Without the knowledge of their need to start treatment, patients who would have qualified for ART, might have preferred to ignore their HIV diagnosis and delay returning to the clinic, whilst continuing in a state of denial about their health. A POC CD4 test ensures that a healthcare provider can immediately inform a patient of the importance of starting treatment thereby optimizing the opportunity to empower the patient with both knowledge of their HIV status and the need to start treatment. Awareness of CD4 count and eligibility for treatment may lead to uptake of ART services before becoming sick or severely immune suppressed. Our findings indicate that HIV-positive youth may be most at risk of attrition immediately after HIV diagnosis, since in both study groups high rates of attrition occurred after the clinic visit at which the patient was first diagnosed. Patients may prefer to test for HIV away from their usual place of residence for reasons of confidentiality. Other patient characteristics and programme factors found to be associated with attrition prior to ART initiation include stigma and fear of disclosure [2].

In both study groups, most patients who returned to the clinic following their HIV diagnosis went on to complete the ART preparation counseling sessions and initiated ART. ART preparation counselling could be adjusted so that the first counseling session occurs on the same day as HIV diagnosis and eligibility assessment. Whilst youth appear to be at greater risk, compared to adults, of attrition prior to ART initiation, POC CD4 testing is likely to benefit this vulnerable group in the same way it benefits adults, by shortening and simplifying the process from HIV testing to ART initiation. Patient factors specific to youth, rather than health service delivery factors, may therefore need to be addressed, if pre-ART attrition is to be reduced for this group. The strengths of this study are that it focused on a population group known for its problems with retention in care and the study was conducted within the arena of routine patient care. The results should therefore be representative of the situation on the ground. The design of the study also allows insights into attrition prior to ART initiation in this group, which is a subject of national and international importance. There were several limitations. First, this study was limited by a small sample size [3].The loss of one of the clinic's registers meant that the desired sample size was not achieved. This limited our ability to interpret the results and draw conclusions from the observed small improvement in the proportion of ART-eligible youth initiating ART and the reduction in days between HIV-testing and ART initiation Second, the changes to the national guidelines during the study period, increasing the CD4 threshold for ART eligibility from 250 to 350 cells/mL, make it impossible to make direct comparisons between the two groups of the effect of POC CD4 testing on the number and proportion of patients who were ART eligible after HIV testing. Third, temporal changes to the baseline characteristics of those testing HIV-positive at the clinic has resulted in patients in after ART having higher CD4 counts compared with those in before ART , reducing the sample which can be directly

compared with before ART patients. Fourth, in the period after the package of care was introduced at the clinic, facility-based nurses were trained and mentored to manage and initiate ART patients. Prior to this, only a doctor was initiating patients on ART [4]. This change may have altered ART initiation processes, and could be another reason for the improvements in clinical staging that we observed in the second group of patients. Finally, even after the installation of POC CD4 testing, some patients did not receive their CD4 results on the day of their HIV test, possibly due to the machine not functioning due to lack of cartridges. The results of this study may not be generalisable to all youth, as in most settings youth access ART care from primary care clinics for all ages, and thus their overall attrition rates may differ [5].

CD4 testing improved ART eligibility assessment, optimized the opportunity to provide a prognosis to the patient at HIV diagnosis, and reduced attrition between HIV-testing and ART eligibility. The small sample size of this study limited our ability to ascertain if the observed improvements in uptake of ART and time to initiation following the introduction of POC testing were real. Further research and strategies are needed to retain youth patients' immediately after HIV diagnosis and ensure that these patients are retained in care and initiate ART when required.

Table 1: Antibodies 2, CD4 counts before and after ART treatment.

Sample numbers	Type of HIV	CD4 counts Before ART	CD4 counts After ART
1(25)	2	145	356
2(33)	2	143	196
3(43)	2	151	263
4(61)	2	113	185
5(75)	2	125	211
6(91)	2	125	136

One-Sample Statistics

Cell counts (cell/mm^3)	N	Mean	Std. Deviation	Std. Error Mean
CD4 counts Before ART	6	133.6667	14.78738	6.03692
CD4 counts After ART		224.5000	76.36950	31.17772

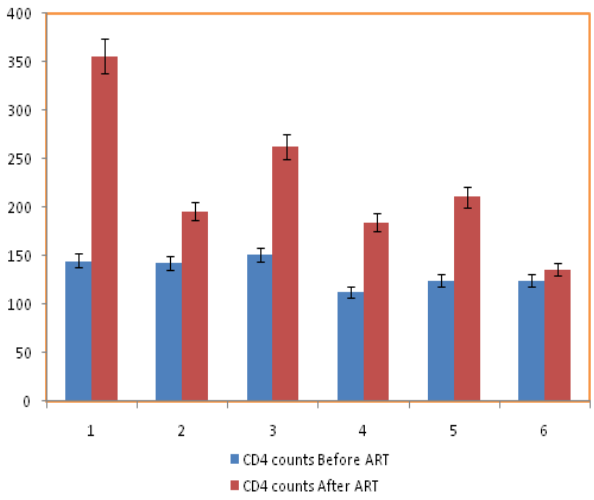

Fig 1: Antibodies 2, CD4 counts before and after ART treatment

Table 2: Antibodies 1 and 2, CD4 counts before and after ART treatment

Antibodies 1 and 2, CD4 counts before and after ART treatment.	Patient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
	Type of HIV	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	CD4 countsBeforeART	250	210	190	198	172	170	189	210	315	411	310	270	215	310	405	191	217	315	271	250	311	340	265	240	135
	CD4 counts After ART	400	315	240	270	300	290	315	375	565	520	475	290	325	375	455	215	270	375	325	314	371	420	232	298	300
	% COC	-150	-10500	-50000	-98000	-12800	-13000	-12600	-16500	-25000	-10900	-16500	-20000	-11000	-65000	-50000	-24000	-53000	-60000	-54000	-64500	-60000	-80000	3300	-55000	-16500
	Patient	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
	Type of HIV	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1
	CD4 countsBeforeART	240	194	211	245	237	230	185	143	311	275	186	214	225	305	242	273	306	151	206	344	256	214	405	375	256
	CD4 counts After ART	301	275	267	315	345	306	263	196	429	312	270	272	309	319	311	355	412	211	245	370	300	275	575	650	302
	% COC	-6100	-8100	-56000	-215	-1080	-7600	-7800	-5300	-1180	-3700	-8400	-5800	-5400	-1400	-6900	-255	-10600	-60000	-40000	-26000	-44000	-6100	-1700	-27000	-46000

	Patient	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
	Type of HIV	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	2
	CD4countsBeforeART	273	292	282	333	390	390	320	240	211	275	109	189	199	275	186	306	376	372	369	329	240	312	409	276	145
	CD4 counts After ART	345	355	319	375	495	495	374	294	276	299	185	252	270	325	244	372	470	349	322	390	303	379	512	340	211
	% COC	-72000	-63000	-37000	-42000	-10500	-10500	-54000	-54000	-65000	-24000	-76000	-63000	-71000	-50000	-58000	-66000	-94000	-249	4700	-61000	-63000	-67000	-91000	-64000	-66000
	Patient	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
	Type of HIV	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1
	CD4 countsBeforeART	375	411	395	365	319	406	275	406	310	315	245	276	319	176	207	111	200	325	372	319	296	245	356	369	349
	CD4 counts After ART	420	475	625	425	375	700	350	511	370	345	270	345	372	250	286	196	269	396	348	372	365	399	411	445	306
	% COC	-45000	-64000	-23000	-3255	-56000	-29400	-75000	-10500	-60000	-30000	-25000	-69000	-53000	-150	-79000	-85000	-69000	-71000	-248	-53000	-69000	-154400	-55000	-76000	43000

REFERENCES

1. Faal M, Naidoo N, Glencross DK, Venter WD, Osih R. Providing immediate CD4 count results at HIV testing improves ART initiation. *J Acquir Immune DeficSyndr*. 2011; 58:54-9.
2. Govindasamy D, Ford N, Kranzer K. Risk factors, barriers and facilitators for linkage to antiretroviral therapy care: a systematic review. *AIDS*. 2012; 26: 2059-67.
3. Nachega JB, Hislop M, Nguyen H, Dowdy DW, Chaisson RE,Regensberg L. Antiretroviral therapy adherence, virologic and immunologic outcomes in adolescents compared with adults in southern Africa. *J Acquir Immune DeficSyndr*. 2009; 51:65-71.
4. Jani IV, Sitoe NE, Alfai ER, Chongo PL, Quevedo JI, Rocha BM, et al. Effect of point-of-care CD4 cell count tests on retention of patients and rates of antiretroviral therapy initiation in primary health clinics: an observational cohort study. *Lancet*. 2011; 378:1572-9.
5. Mugglin C, Estill J,Wandeler G, Bender N, Egger M, Gsponer T, et al. Loss to programme between HIV diagnosis and initiation of antiretroviral therapy in sub-Saharan Africa: systematic review and meta-analysis. *Trop Med Int Health*. 2012; 17:1509-20.