

ORIGINAL RESEARCH**Retrospective Study of Efficacy of TLE & TLD Regimens in Correlation with CD4 Count and Viral Load in newly Diagnosed HIV Infected Patients****Jagan V¹, V. Vijaya Swetha², N. Padma Priya³**¹ 3rd Post graduate, Department of Microbiology, GMC, Ongole, Andhra Pradesh, India² Assistant Professor, Department of Microbiology, GMC, Ongole, Andhra Pradesh, India³ Associate Professor, Department of Microbiology, GMC, Ongole, Andhra Pradesh, India**ABSTRACT**

Background: The aim of the present study is to the comparison of viral load suppression and increase in CD4 count in the HIV reactive patients by the new regimen (TLE) within shorter period compared to the old regimen (TLD).

Material and Methods: The study includes newly diagnosed 100 HIV patients. The data collected included age, sex, regimen used by the HIV patients, CD4 count and Viral Load count. Out of these 100 patients 50 of them were initiated on old ART regimen (TLE) and other 50 of them were initiated on new ART regimen (TLD). The CD4 count was estimated using Flowcytometry (BD FACS CountTM) and Viral Load count was estimated by RT-PCR technique (Abbott HIV-1 Assay).

Results: After 6 months out of 50 patients who were on TLE (old regimen), 40 of them showed CD4 count, >560 cells/mm³ and Viral Load target not detected and 10 of them showed CD4 count >460 cells/mm³ and Viral Load 300 copies/ml. and out of 50 patients on TLD (new regimen), 45 of them showed CD4 count, >650 cells/mm³ and Viral Load target not detected and 5 of them showed CD4 count >500 cells/mm³ and Viral Load 150 copies/ml. After 12th month out of 50 patients who were on TLE (old regimen), showed CD4 Count > 680 cells/mm³ and 45 of patients showed viral load target not detected and 10 showed 210 copies/ml. After out of 50 patients who were on TLD (new regimen) showed CD4 Count > 800 cells/mm³ and Viral load target not detected.

Conclusion: Present study concluded that, the new regimen (TLD) is well- tolerated and more efficient in viral suppression than old regimen (TLE). The immunological monitoring is essential for the overall success of treating, monitoring and control of HIV.

Keywords: CD4 count, ART, TLD, TLE, HIV.

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INTRODUCTION

Human Immuno deficiency Virus and its associated infections are major health burden around the world. Though India being second largest populous country in the world its HIV prevalence is lesser than most of the countries.^[1] This is due to the stringent and meticulous National programs devised by the government and its proper implementation. The diagnosis of HIV according to NACP guidelines it is necessary to use three different principles or antigen-based rapid tests to confirm the diagnosis. All samples reactive in the first test should further undergo confirmatory second/third tests based on different principles/antigens using the same serum/plasma sample as that of the first test.^[1] The surrogate markers such as CD4 count and Viral Load Count help in monitoring the immune status and viral replication count

in the patient. The CD4 count is an important prognostic marker for monitoring the immune status of the patient with HIV infection. The decrease of CD4 count indicates the immuno deficiency that is progressing in the patient. Hence monitoring of the CD4 at regular interval helps in planning the treatment for the patient. The estimation of CD4 count is done after the patient is first diagnosed as HIV reactive by confirmatory test (Wester, for the baseline count for comparing with the CD4 count after initiation of therapy. The NACP guidelines indicates initiation of ART based on CD4 count. The CD4 count cut-off point for ART initiation moving from less than 200 cells/cmm in 2004 to less than 350 cells/cmm in 2010 and then to less than 500 cells/cmm in 2013. The current NACP guidelines recommend to treat all the HIV diagnosed patients.^[1] The viral load estimation is another important prognostic marker where the direct effect of the ART regimen in the patients is monitored. The decrease in the viral load cell count in the patients indicates the effectiveness of ART regimen and compliance of the patient to the treatment program. Hence the viral load testing is a important marker.^{[2],[6]} The current recommendation is to treat all the HIV diagnosed patients regardless of the CD4 count or WHO Clinical Staging or age group or population sub-groups. The new regimen from 2018 according to NACP guidelines has changed from TLE (Tenofovir + Lamivudine + Efavirenz) to TLD (Tenofovir + Lamivudine + Dolutegravir). This regimen has the advantage of harmonization in the treatment of all adults, adolescents, pregnant women and those with HIV-TB and HIV Hepatitis co-infections. It is a simple, potent and well tolerated regimen that offers the advantage of a decentralized service delivery and monitoring. It also simplifies the supply chain and minimizes the monitoring requirements.^[1] The comparison of viral load suppression and increase in CD4 count in the HIV reactive patients by the new regimen (TLE) within shorter period compared to the old regimen (TLD) is the main focus of the study.

MATERIALS & METHODS

Study design: - Retrospective analytical study.

Period of study: - January 2021 to December 2021.

Sample: - 100 newly diagnosed HIV patients.

Name of institute: - Government General Hospital and College, Ongole, Andhra Pradesh.

The study includes newly diagnosed 100 HIV patients. The data collected included age, sex, regimen used by the HIV patients, CD4 count and Viral Load count. Out of these 100 patients 50 of them were initiated on old ART regimen (TLE) and other 50 of them were initiated on new ART regimen (TLD). The CD4 count was estimated using Flowcytometry (BD FACSCount™) and Viral Load count was estimated by RT-PCR technique (Abbott HIV-1 Assay). Baseline CD4 count was estimated for both the group. The CD4 count and Viral Load count was estimated for 50 patients at 6 months after initiation old regimen (TLE) and recorded. And the CD4 count and Viral Load count was estimated for 50 patients at 6 months after initiation new regimen (TLD) and recorded. Then at 12 months after initiation of old ART regimen (TLE), CD4 Count and Viral Load count were estimated for the 50 patients in the group and recorded. And 12 months after initiation of new ART regimen (TLD), CD4 Count and Viral Load count were estimated for the 50 patients in the group and recorded. And the recorded data was collected from the ART centre and statistical analysis done using Microsoft Excel.

RESULTS

Out of 100 patients newly diagnosed for HIV patients, 49 were female, 50 were male and 1 transgender. The median age of the population was 45 years old. All the patients showed initial baseline CD4 count of <260 cells/mm³. After 6 months out of 50 patients who were on

TLE (old regimen), 40 of them showed CD4 count, >560 cells/mm³ and Viral Load target not detected and 10 of them showed CD4 count >460 cells/mm³ and Viral Load 300 copies/ml. and out of 50 patients on TLD (new regimen), 45 of them showed CD4 count, >650 cells/mm³ and Viral Load target not detected and 5 of them showed CD4 count >500 cells/mm³ and Viral Load 150 copies/ml. After 12th month out of 50 patients who were on TLE (old regimen), showed CD4 Count > 680 cells/mm³ and 45 of patients showed Viral load target not detected and 10 showed 210 copies/ml. After out of 50 patients who were on TLD (new regimen) showed CD4 Count > 800 cells/mm³ and Viral load target not detected.

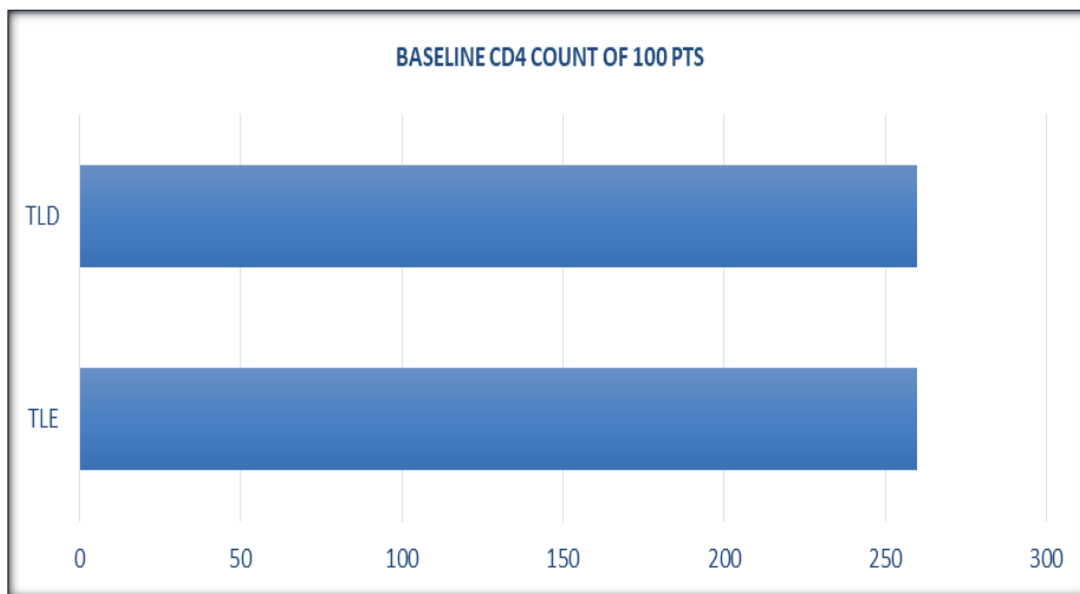


Figure 1: Baseline CD4 count of 100 Patients

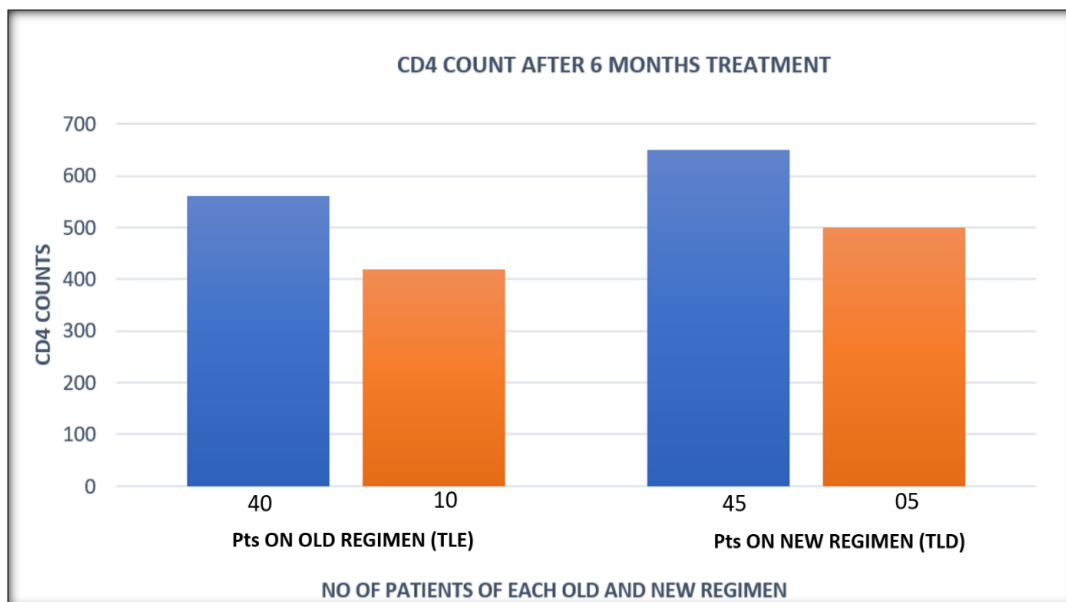


Figure 2: CD4 count after 6 months treatment

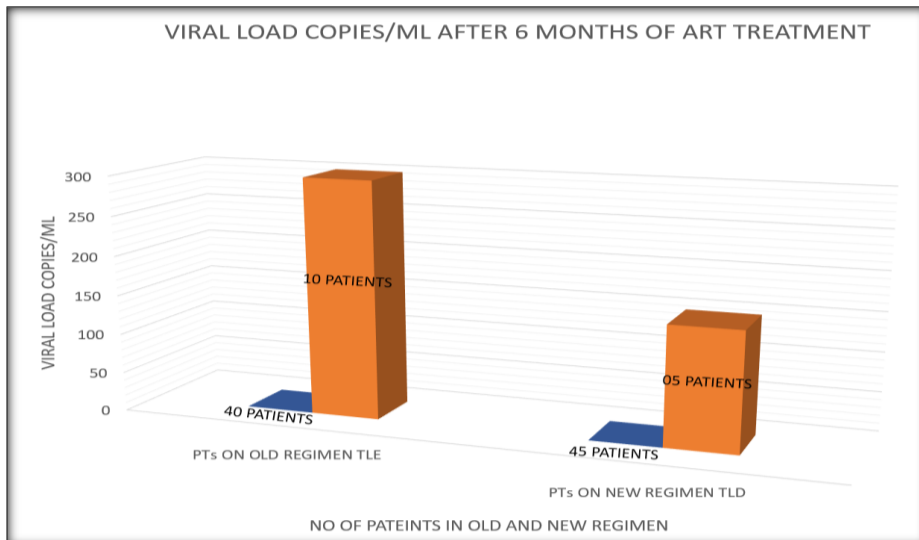


Figure 3: Viral load copies/ml after 6 months of treatment

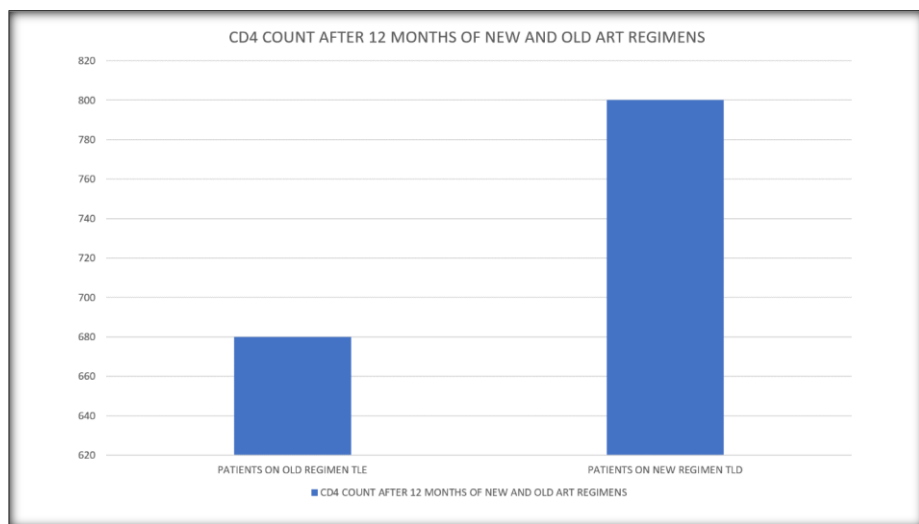


Figure 4: CD4 count after 12 months of new and old ART Treatment

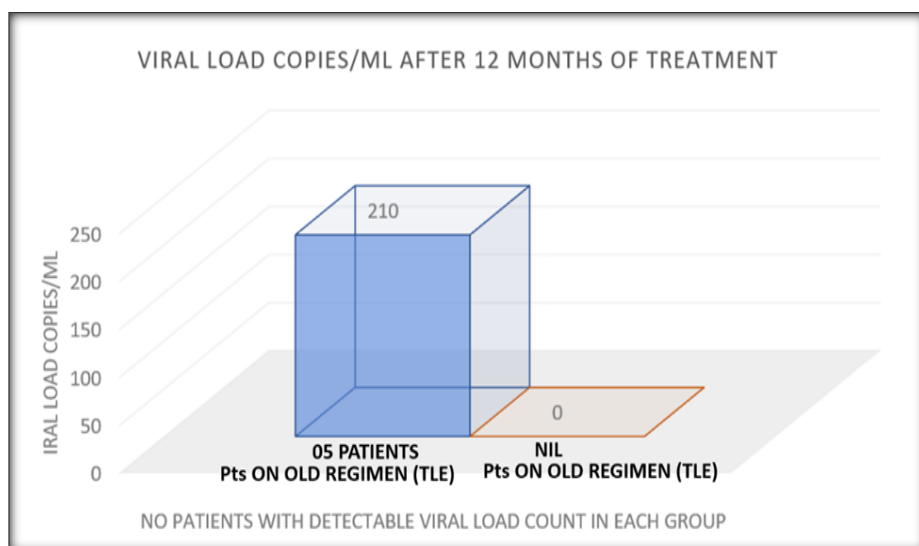


Figure 5: Viral load copies/ML after 12 months of treatment

DISCUSSION

The study included 100 new HIV reactive patients and ART naïve, who were initiated on TLE (Old ART regimen) and TLD (New ART regimen). The median age of the 100 patients group was 40.46 years hence the analytical study was done in a predominantly adult population.

All the 100 patients were estimated for CD4 count by flowcytometry as a baseline before initiating ART treatment which as on average <260 cells/mm³.

After initiating ART regimen, at 6th month, the old regimen group (TLE), 40 of the patients with no viral load detected, there rise of CD4 count by 115.3% compared to base line. And the other 10 patients of the group with <300 copies/ml of viral load on average showed a 61.3% of rise compared to baseline. After initiating ART regimen, at 6th month, the new regimen group (TLD), 45 of the patients with no viral load detected, there rise of CD4 count by 150% compared to base line. And the other 05 patients of the group with <150 copies/ml of viral load on average showed a 92.3% of rise compared to baseline. After initiating ART regimen, at 12th month, the old regimen group (TLE), 50 of the patients showed rise of CD4 count by 161% compared to base line. In the 50 patients of the group 45 of them showed no target detected on viral load estimation and 5 of them had 30% (<210 copies/ml) decrease in their viral load count compared to baseline. After initiating ART regimen, at 12th month, the new regimen group (TLE), 50 of the patients showed a significant rise of CD4 count by 207.6% compared to base line. And all 50 patients of the group no target detected on viral load estimation, showing the drastic decrease of viral load count by the newly added drug Dolutegravir.

According to the change in the new ART regimen, instead of Efavirenz, Dolutegravir was introduced. The fixed dose combinations (FDC) were introduced because they are easy to prescribe and easy for patients to take, thereby facilitating improved and desirable treatment adherence. The drug Dolutegravir was approved for usage in ART in India from July 2020.^[2]

The Dolutegravir is Integrase Strand Transfer Inhibitor; the other drug in that group is Raltegravir. The drug inhibits the integrase enzyme which helps in strand transfer from viral genome to the DNA of the host cell. Since integration is a vital step in retroviral replication, blocking it can halt further replication of the virus.

As the drug blocks the further replication of virus in host, the Viral load detection and CD4 count are good markers for studying the effectiveness of the drug. The baseline CD4 count done in patients at start of the treatment give the picture of the immunosuppression and possibilities of other HIV co-infection in the patient. And the viral load and CD4 count done at 6th month of ART treatment gives the status of patient whether the patient was compliant to the regimen, viral replication status in the patient. And viral load and CD4 count had done at 12th month of treatment helps in further monitor the patient status. The CD4 count more than 350 cells/mm³ and viral load less than 1000 copies/ml indicates the patient has good prognosis. If CD 4 counts not improving and viral load > 1000 copies/ml the patient is advised to step up the regimen and encouraged to be more compliant to the regimen. The national programme uses the viral load tests for Routine viral load monitoring where viral load test is done at specific regular intervals to detect change in viral load for patients on ART.^[1] The result of this test can trigger step-up adherence support and/or switching ART regimen and Targeted viral load monitoring for confirmation of treatment failure. The CD4 count and Viral load measurement is essential for effective monitoring of the effectiveness of the treatment in HIV reactive patients.

S.No	ART REGIMEN	No. OF PATIENTS	% OF INCREASE IN CD4 COUNT BASELINE-6 MONTHS	VL COUNT AT 6 TH MONTH	% OF INCREASE IN CD4 COUNT 6 MONTHS – 12 MONTHS	% OF DECREASE IN VL COUNT FROM 6 TH – 12 TH MONTH
1	TLE	40	115.3% ↑	TND	-	-
2	TLE	10	61.3% ↑	<300 copies/ml	-	-
3	TLD	45	150% ↑	TND	-	-
4	TLD	5	92.3% ↑	<150 copies/ml	-	-
5	TLE	50	-	-	161% ↑	-
6	TLE	45	-	-	-	TND ↓
7	TLE	5	-	-	-	30% ↓ (<210 copies/ml)
8	TLD	50	-	-	207.6% ↑	TND ↓

CONCLUSION

In present study, surrogate markers such as viral load and CD4 count in HIV reactive patients give us good information about the prognosis and progression of the infection. Viral load provides an early and more accurate indication of treatment failure and the need to switch to second-line drugs. This helps reduce the accumulation of drug-resistance mutations and improve clinical outcomes of the PHLIV on ART.^[3] Viral load estimation helps to distinguish between treatment failure and non-adherence. Viral load is recognized as the gold standard for monitoring of ART response.^[1] The CD4 count provides the immune status of the patient by which the treatment is planned. In the study the drug was well tolerated by both sexes and all age group. The drug Dolutegravir was effective than Efavirenz as there was significant rise in CD4 count and decrease of viral load copies/ml. Hence the new regimen (TLD) is well-tolerated and more efficient in viral suppression than old regimen (TLE). The immunological monitoring is essential for the overall success of treating, monitoring and control of HIV.

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