



TO STUDY THE CHANGE IN CD4 COUNT AND INCIDENCE OF OPPORTUNISTIC INFECTION IN PATIENTS OF HIV ON ANTIRETROVIRAL THERAPY AFTER SWITCH OVER FROM TLE TO TLD

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ABSTRACT

Background: HIV/AIDS affects millions of people worldwide, with cases reported in virtually every country. In 2022, 39.0 million [33.1 million–45.7 million] people globally were living with HIV, and 1.3 million [1 million–1.7 million] people became newly infected [1]. Opportunistic infections (OIs) are defined as infections occurring due to bacteria, fungi, viruses, or parasites that normally do not cause a disease but become pathogenic when the body's defense system is impaired. Dolutegravir is a once-daily unboosted second-generation integrase strand transfer inhibitor (INSTI) [2], whereas Efavirenz is a NNRTI. **Aim:** Evaluation of change in CD4 Count and incidence of opportunistic infection in patients of HIV on Antiretroviral therapy after switch over from TLE to TLD. **Method:** This was an observational study on HIV Patients. 80 patients were included in the study; patients on ART regime were taken for study, the study investigated for CD4 count and opportunistic infections in HIV patients undergoing Antiretroviral therapy (ART) regime switch from Efavirenz (TLE) to Dolutegravir (TLD). **Result:** In the present study, the baseline CD4 count increased significantly from 268.24 ± 65.49 to 359.65 ± 69.41 after six months of Switch over of regime from Efavirenz based to Dolutegravir based regime, indicating a 25.42% mean change. Opportunistic infections were monitored as part of the assessment, revealing prevalence rates among participants. Pulmonary tuberculosis was present in 23.75% of patients on TLE compared to 11.25% on TLD. Oral candidiasis affected 16.25% on TLE and 6.25% on TLD. Acute gastroenteritis occurred in 18.75% on TLE and 7.5% on TLD. **Conclusion:** According to this study, tenofovir/lamivudine/dolutegravir (TLD)-based antiretroviral medication (ART) users are more effectively increasing the CD4 count of the patient and decreasing the incidence of opportunistic infections. Further research and analysis is required to confirm the diagnosis.

KEYWORDS : CD4 count, HIV, ART, TLD, TLE, Opportunistic infections

INTRODUCTION

The current CDC classification system for HIV infection and AIDS categorizes patients based on clinical conditions associated with HIV infection and their level of CD4+ T lymphocyte count. HIV/AIDS affects millions of people worldwide, with cases reported in virtually every country. In 2022, 39.0 million [33.1 million–45.7 million] people globally were living with HIV, and 1.3 million [1 million–1.7 million] people became newly infected [2]. India has the world's third-largest HIV load, with an anticipated 2.3 million people living with HIV (PLHIV) in 2021, 63 thousands of whom were newly infected, and 42 thousand yearly fatalities caused by the illness. Opportunistic infections (OIs) are defined as infections occurring due to bacteria, fungi, viruses, or parasites that normally do not cause a disease but become pathogenic when the body's defense system is impaired [3]. These pathogens mostly do not cause disease in a healthy host that has a normal immune system; penetrating injury or lack of completion from Normal commensals present an opportunity for the pathogen to infect. The most common opportunistic infection in India is TB. Several studies were done to find the incidence of opportunistic infection in India. [4]

Dolutegravir is a once-daily unboosted second-generation integrase strand transfer inhibitor (INSTI) [2], whereas Efavirenz is a NNRTI. It has been seen that the dolutegravir (TLD)-containing regime has effective viral load suppression. Patients on the dolutegravir-based regime showed better compliance, mostly due to lesser side effects from daily dosing or smaller pills. The newer TLD-based regimes are also cost-effective. Several studies have evaluated the effectiveness and safety of DTG, and results showed that the DTG-based

regimen provided a faster and more sustainable drug effect than the EFV-based regimen [5-6].

This research was conducted to evaluate change in CD4 count and decrease in incidence of opportunistic infection in HIV Patients on ART regime switch over from Efavirenz based [TLE] to Dolutegravir based [TLD regime].

MATERIAL AND METHOD

This prospective observational case study was carried out at Swaroop Rani Nehru Hospital, Moti Lal Nehru Medical College (MLNMC), Prayagraj, Uttar Pradesh, India. ; 80 patients were included in the study; patients on ART regime were taken for study, the study investigated for change in CD4 count and change in incidence of opportunistic infections like acute gastroenteritis, oral candidiasis and pulmonary kochs in HIV patients undergoing Antiretroviral therapy (ART) regime switch from Efavirenz (TLE) to Dolutegravir (TLD).

Inclusion Criteria

- Age greater than 18 years.
- The patients on Dolutegravir based ART regime were taken for the study.

Exclusion Criteria

- Age < 18 years
- Patients who are Not on efavirenz therapy or Not taking dolutegravir.
- Patient not tolerating Dolutegravir.
- And those unwilling for study related diagnostic procedures were excluded from the study.
- CD4 count was done during first visit at ART centre and After 6 month of follow up.

RESULTS

The study included 80 participants aged between 22 and 65 years, with a mean age of 40.34 years (SD = 10.75) and a median age of 39 years. The age distribution showed that 18 participants (22.5%) were in the 18-30 years range, 26 participants (32.5%) were in the 31-40 years range, 20 participants (25.0%) were in the 41-50 years range, 14 participants (17.5%) were in the 51-60 years range, and 2 participants (2.5%) were above 60 years.

Table 1: Age Distribution Among Study Participants.

Age Intervals	Frequency	Percent
18-30 years	18	22.5
31-40 years	26	32.5
41-50 years	20	25.0
51-60 years	14	17.5
above 60 years	2	2.5
Total	80	100.0

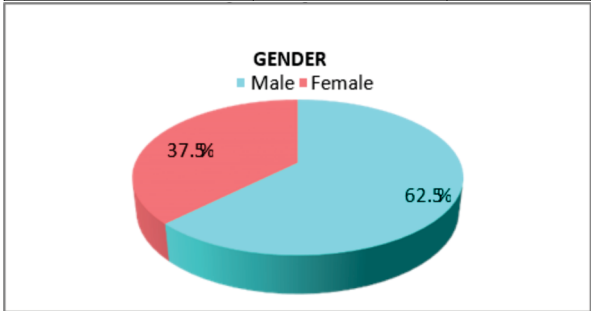


Figure 1: Sex Distribution Among Study Participants

Table 2: Baseline Characteristics Of Clinical Parameters.

	Mean	SD	Median	Min	Max	Valid N
Cd4 count	268.24	65.49	272.00	114.00	411.00	80
Haemoglobin	10.90	1.83	11.00	5.40	14.70	80
TLC	7334.88	3193.76	6600.0	3310.00	26400.0	80
SGOT	37.66	13.92	34.00	20.00	96.00	80
SGPT	25.04	9.42	22.00	15.00	81.00	80
HDL	49.47	9.58	48.25	31.70	69.00	80
LDL	105.93	35.30	99.35	.80	190.60	80
S. Urea	24.44	6.71	23.00	15.00	43.00	80
S. Creatinine	1.03	0.23	1.00	0.70	2.10	80

In a paired analysis of CD4 counts with 80 participants, the baseline CD4 count was 268.24 ± 65.49 , which increased to 359.65 ± 69.41 after six months. The mean difference was -91.41, reflecting a 25.42% mean change. This increase in CD4 count was statistically significant with a p-value of <0.001 .

Table 3 : Paired Analysis Of CD4 Count. N=80

Baseline CD4 count	Cd4 count after 6 months of switch over TLE to TLD	Mean difference	%mean change	p-value
268.24 ± 65.49	359.65 ± 69.41	-91.41	-25.42%	<0.001

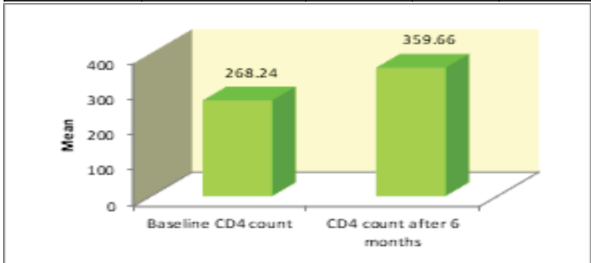


Figure 3 : CD4 count at baseline and at 6 month of switch over from Efavirenz(TLE) to Dolutegravir(TLD)

The switch from Efavirenz (TLE) to Dolutegravir (TLD) in HIV patients resulted in significantly lower rates of pulmonary tuberculosis ($p = 0.037$), oral candidiasis ($p = 0.045$) and acute gastroenteritis ($p = 0.035$). These findings indicate that transitioning to TLD may potentially reduce the incidence of these opportunistic infections. Hospital admission rates were also reduced to a significant level ($p = 0.022$).

Table 4: Association Of Opportunistic Infections With TLE And TLD

	TLE		TLD		p value
	N	%	N	%	
Pulmonary TB	19	23.75	9	11.25	0.037
Oral candidiasis	13	16.25	5	6.25	0.045
Acute Gastroenteritis	15	18.75	6	7.5	0.035
Hospital admission	16	20	6	7.5	0.022

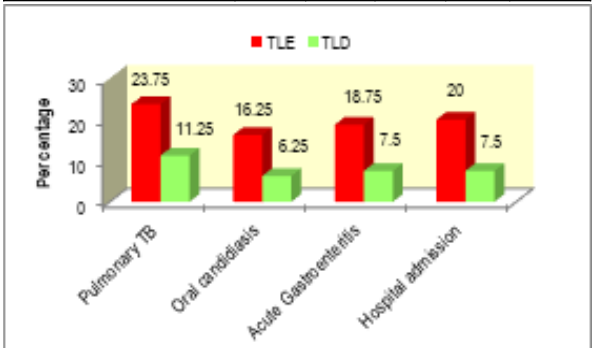


Figure 4: Oppurtunistic infections at baseline and at 6 month of switch over from Efavirenz(TLE) to Dolutegravir(TLD)

DISCUSSION

This prospective observational case study was carried out at Swaroop Rani Nehru Hospital, Moti Lal Nehru Medical College (MLNMC), Prayagraj, Uttar Pradesh, India, on a total of 80 participants aged between 22 and 65 years, with a mean age of 40.34 ± 10.75 years, to assess the clinical outcomes in HIV patients on ART regime switch over from efavirenz [EFV] based to dolutegravir [DTG] based regime. The baseline CD4 count increased significantly from 268.24 ± 65.49 to 359.65 ± 69.41 after six months of Switch over of regime from Efavirenz based to Dolutegravir based regime, indicating a 25.42% mean change. This result is in harmony with a meta-analysis done by Sonya et al., who reported that treatment with DTG resulted in a significantly greater increase in mean CD4+ cell count from baseline at week 48 than EFV [7,8].

The switch from Efavirenz (TLE) to Dolutegravir (TLD) in HIV patients resulted in significantly lower rates of pulmonary tuberculosis ($p = 0.037$), oral candidiasis ($p = 0.045$), and acute gastroenteritis ($p = 0.035$). These findings indicate that transitioning to TLD may potentially reduce the incidence of these opportunistic infections. Hospital admission rates were also reduced to a significant level ($p = 0.022$). Similarly, Mahale et al. (2023) [9] provided real-life evidence of better outcomes of therapy with DTG over EFV in terms of viral load suppression, but immunologic recovery is equivalent in EFV-based regimens after six months of treatment,

CONCLUSION

The study, conducted at Swaroop Rani Nehru Hospital, Moti Lal Nehru Medical College in Uttar Pradesh, India, involved 80 participants aged 22–65 years, with a mean age of 40.34 ± 10.75 years. Males (62.5%) outnumbered females (37.5%).

The baseline CD4 count increased significantly from 268.24 ± 65.49 to 359.65 ± 69.41 after six months, indicating a 25.42% mean change.

The switch from Efavirenz (TLE) to Dolutegravir (TLD) in HIV patients resulted in significantly lower rates of pulmonary

tuberculosis ($p = 0.037$), oral candidiasis ($p = 0.045$), and acute gastroenteritis ($p = 0.035$). These findings indicate that transitioning to TLD may potentially reduce the incidence of these opportunistic infections. Hospital admission rates were also reduced to a significant level ($p = 0.022$).

Limitations Of The Study

Due to small sample size results are subject to Type II error. Viral load test was not carried out but increase in CD4 count suggesting adequate viral suppression. Individual drugs can not be studied due to combination therapy. Larger randomised control trial is required to strengthen the result of study.

REFERENCES

1. Global HIV & AIDS statistics - fact sheet 2023 - world [Internet]. 2023 [cited 2024 Mar 22]. Available from: <https://reliefweb.int/report/world/global-hiv-aids-statistics-fact-sheet-2023>
2. Kandel CE, Walmsley SL. Dolutegravir—a review of the pharmacology, efficacy, and safety in the treatment of HIV. *Drug design, development and therapy*. 2015 Jul 7;3547-55.
3. CDC Opportunistic Infections definition. Available at: <https://www.cdc.gov/hiv/basics/livingwithhiv/opportunisticinfections.html>
4. Ghate M, Deshpande S, Tripathy S, Nene M, Gedam P, Godbole S, Thakar M, Risbud A, Bollinger R, Mehendale S. Incidence of common opportunistic infections in HIV-infected individuals in Pune, India: analysis by stages of immunosuppression represented by CD4 counts. *International journal of infectious diseases*. 2009 Jan 1;13(1):e1-8.
5. Rutherford GW, Horvath H. Dolutegravir plus two nucleoside reverse transcriptase inhibitors versus efavirenz plus two nucleoside reverse transcriptase inhibitors as initial antiretroviral therapy for people with HIV: a systematic review. *PLoS One*. 2016 Oct 13;11(10):e0162775.
6. Ota R, Ishii H, Tsuda M, Higuchi Y, Yamashita F. A model-based comparative meta-analysis of the efficacy of dolutegravir-based and efavirenz-based regimens in HIV-infected patients. *Journal of Infection and Chemotherapy*. 2019 Sep 1;25(9):687-94.
7. Patel DA, Snedecor SJ, Tang WY, Sudharshan L, Lim JW, Cuffe R, Pulgar S, Gilchrist KA, Camejo RR, Stephens J, Nichols G. 48-week efficacy and safety of dolutegravir relative to commonly used third agents in treatment-naïve HIV-1-infected patients: a systematic review and network meta-analysis. *PloS one*. 2014 Sep 4;9(9):e105653.
8. Snedecor SJ, Radford M, Kratochvil D, Grove R, Puneekar YS. Comparative efficacy and safety of dolutegravir relative to common core agents in treatment-naïve patients infected with HIV-1: a systematic review and network meta-analysis. *BMC infectious diseases*. 2019 Dec;19:1-4.
9. Mahale PR, Patel BS, Kasmani N. Treatment outcomes of dolutegravir-versus efavirenz-based highly active antiretroviral therapy regimens among treatment-naïve people living with HIV. *Cureus*. 2023 Jun;15(6).