Changes in Inflammation Scores Among People Living with HIV (PLWH) Under Different Antiretroviral Treatment (ART) Regimes

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Background

✓ Despite the advances in antiretroviral treatment (ART), persistent inflammation remained a challenge.

✓ Markers such as high-sensitivity C-Reactive Protein (hs-CRP), interleukin-6 (IL-6) and soluble tumor necrosis factor-α receptors I and II (sTNF-RI and sTNF-RII) are used as an indicator of inflammation.

✓ However, many of these markers require extra examination and costly methods.

✓ There is a need for tests that can be used more easily and guide us, such as the complete blood count (CBC), which is often requested in daily life.

✓ We determined inflammatory-score changes through 2-years in PLWH treated with different antiretroviral regimes.

Methods

✓ This study was conducted in Hacettepe University HIV/AIDS Treatment and Research Center. PLWH diagnosed between 2014-2020 were included.

✓ The Hacettepe HIV cohort has been recruiting since 1985.

✓ Inflammatory and metabolic markers (CD4/CD8 ratio, Systemic Inflammatory Index ((SII): PxN/L, where P, N, and L were the preoperative peripheral platelet, neutrophil, and lymphocyte counts, respectively), Neutrophil-Lymphocyte Ratio (NLR), Mean Platelet Volume (MPV), Platecrite (PCT), and Low-Density Lipoprotein/High-Density Lipoprotein (LDL/HDL)) and ARTs were captured from database through 2-years from the diagnosis.

✓ Blood samples were analyzed with Unicel DxH800 System Hematology Analyzer". (Beckman Coulter, USA)

✓ The 2-year change (Δ) in markers was calculated and compared by ART type (backbone: TDF+FTC / ABC+ 3TC, and 3rd agent: Integrase inhibitors, Protease inhibitor and NNRTI).

✓ Mann-Whitney-U test was used for statistical analysis.

Results

✓ This study included 205 PLWH; 175 were male (85.4%), and the mean age was 38.98±10.88 years. The demographic data of the patients are given in Table 1.

✓ The number of patients with suppression of viremia was 164 (80%) (<40 HIV-RNA copies/ml) at the end of the second year.

✓ An increase in MPV was significantly higher among PLWH receiving ABC/3TC compared to PLWH receiving TDF/FTC (p<0.05).

✓ The CD4:CD8 ratio increased, and SII, NLR, LDL/HDL ratios decreased significantly among PLWH treated with integrase inhibitors compared with protease inhibitors and Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs) (p<0.05) (Table 2 and 3).

Table 1. The demographic data of the patients

Age (years), mean ± SD	38.98 ±10.88
Gender, n (%)	
Female	175 (85.4)
Male	30 (14.6)
Antiretroviral backbone regimen, n (%)	
TDF+FTC	163 (79.5)
ABC+3TC	41 (20.0)
AZT+3TC	1 (0.5)
Third antiretroviral agent, n (%)	
Dolutegravir	113 (55.1)
Elvitegravir	31 (15.1)
Darunavir/ritonavir	22 (10.7)
Lopinavir/ritonavir	19 (9.3)
Efavirenz	15 (7.3)
Others	5 (2,5)

Table 2. Baseline and 24th month values of inflammation-related markers , median (minimum, maximum)

Marker	Baseline values							24th month values						
	Backbone regimen		p	3rd agent			p	Backbone regimen		p	3rd agent			p
	TDF+FTC	ABC+3TC		Integrase inhibitors	Protease inhibitor	NNRTI		TDF+FTC	ABC+3TC		Integrase inhibitors	Protease inhibitor	NNRTI	
CD4/CD8	0.47 (0.01-1.76)	0.52 (0.08-1.65)	0.306	0.50 (0.02-1.76)	0.40 (0.01-1.33)	0.46 (0.08-1.33)	0.135	0.91 (0.04-2.82)	0.87 (0.23-1.62)	0.014	0.98 (0.04-2.82)	0.78 (0.18-1.64)	0.68 (0.18-1.36)	0.001
SII	542.04 (50.48-7742.00)	460.91 (128.84-1523.20)	0.603	511.02 (50.48-7742.00)	615.34 (55.64-6241.33)	396.04 (34.21-870.00)	0.702	421.76 (84.78-1249.11)	430.40 (177.08-1448.22)	0.547	404.62 (85.15-1448.22)	492.89 (168.00-1063.91)	389.09 (26.00-1249.11)	0.097
NLR	2.56 (0.34-49.00)	2.04 (0.63-4.00)	0.472	2.44 (0.46-49.00)	2.65 (0.34-20.67)	1.96 (0.26-3.18)	0.844	1.82 (0.53-5.67)	1.75 (0.70-4.22)	0.903	1.72 (0.53-5.67)	2.02 (0.95-4.78)	1.91 (0.50-4.26)	0.087
MPV	8.39 (5.7-14.0)	8.14 (6.6-10.3)	0.168	8.28 (6.5-10.6)	8.66 (5.7-14.0)	8.32 (6.9-11.2)	0.187	8.50 (6.40-11.20)	8.65 (7.20-11.40)	0.476	8.48 (6.4-11.4)	8.60 (7.1-10.7)	8.77 (6.9-11.0)	0.964
PCT	0.18 (0.03-0.39)	0.18 (0.11-0.32)	0.883	0.18 (0.03-0.378)	0.19 (0.10-0.385)	0.16 (0.03-0.277)	0.721	0.20 (0.05-0.38)	0.20 (0.13-0.28)	0.169	0.20 (0.10-0.40)	0.20 (0.10-0.40)	0.18 (0.05-0.324)	0.049
LDL/HDL	3.05 (1.05-9.06)	2.94 (1.23-4.57)	0.656	3.11 (1.14-9.06)	2.75 (1.05-5.19)	2.75 (1.13-4.28)	0.012	3.11 (0.51-7.84)	2.68 (1.75-4.39)	0.193	2.98 (0.51-4.79)	3.06 (1.55-5.68)	3.32 (1.80-7.84)	0.828

Table 3. Change in inflammation-related markers in the 24th month from baseline, median (minimum, maximum)

Marker	Backbone regimen		p	3rd agent			p
	TDF+FTC	ABC+3TC		Integrase inhibitors	Protease inhibitor	NNRTI	
ΔCD4/CD8	+0.36 (-0.48, +2.64)	+0.34 (-0.32, +0.62)	0.828	+0.38 (-0.35, +2.64)	+0.28 (-0.36, 0.94)	+0.19 (-0.48, +0.93)	0.007
ΔSII	+5.16 (-1196.43, +801.33)	-20.24 (-175.15, +686.97)	0.322	-24.32 (-1196.43, +724.25)	+54.97 (-477.38, +801.33)	+55.47 (-258.66, +379.11)	0.033
ΔNLR	-0.08 (-3.58, +3.53)	-0.34 (-1.10, +0.47)	0.407	-0.26 (-3.58, 2.84)	+0.04 (-3.48, +3.53)	+0.12 (-1.72, +1.26)	0.033
ΔMPV	+0.10 (-3.30, +2.40)	+0.35 (-0.40, +1.20)	0.013	+0.20 (-1.80, +2.30)	-0.20 (-3.30, +2.40)	+0.15 (-1.30, +1.40)	0.005
ΔPCT	+0.02 (-0.18, +0.19)	+0.03 (-0.01, +0.09)	0.817	+0.02 (-0.18, +0.19)	+0.03 (-0.02, +0.11)	+0.03 (-0.08, +0.10)	0.041
ΔLDL/HDL	+0.04 (-5.78, 1.43)	+0.03 (-1.39, 1.09)	0.966	-0.10 (-5.78, +1.09)	+0.46 (-0.86, +1.38)	+0.32 (-0.62, +1.43)	0.039

Conclusions

✓ Integrase inhibitor treatment is related to favorable inflammatory marker profile among PLWH in the 2-year follow-up.

✓ A favorable inflammatory profile may, in turn, contribute to the prevention of non-AIDS conditions among PLWH.

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