Long-term CD4 cell count improvement in HIV-1 infected individuals with long-term sustained viral suppression on cART

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Background

- Restoration of CD4 cell count levels towards normal in cART-treated HIV-infected individuals may not be feasible when CD4 cell counts at the start of cART are low
- Previously, we investigated changes in CD4 cell counts in patients on continuous cART and with viral suppression <500 copies/ml.
- Objective: Extending these observations to patients with suppressed viral load below 50 copies/ml for a period of up to 8 years.

Methods

HIV-1 infected patients selected from the national observational ATHENA cohort who were:

- ART-naïve and >16 years of age at start of cART.
- Virological suppressed to below 50 copies/ml within 9 months after start.

Outcome:

- CD4 cell counts between start of cART and earliest of following events: end of follow-up, cART interruption >2 weeks, start of chemotherapy or peg-interferon, first of 2 consecutive plasma viral load measurements >50 copies/ml.
- **Statistical analysis:**
- CD4 cell counts were longitudinally modelled using mixed effects models.
- The association between CD4 slopes, CD4 cell counts at the start of cART (<50, 50-200, 200-350, 350-500, and ≥500 cells/mm^3) and gender, HIV RNA and age at cART initiation, transmission risk group, HBV (HBsAg-positive) and HCV (HCV RNA, if not available HCV Ab) co-infection and region of origin were investigated.
- A random intercept and 3 random slopes (0-6, 6-24, and ≥24 months) for each patient was included.

Results

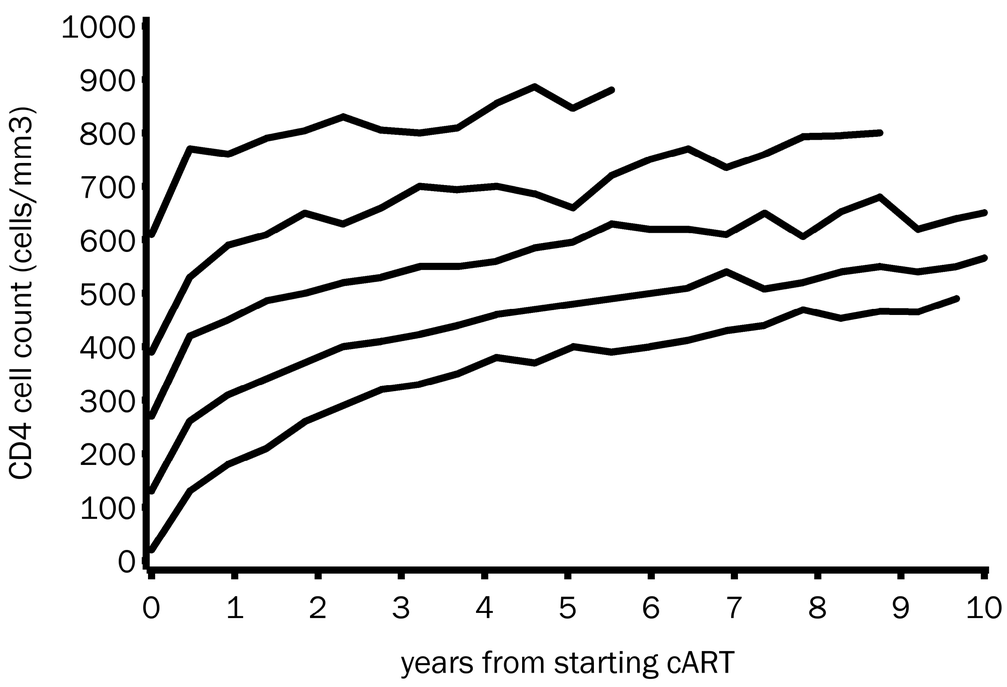

Figure. Median CD4 cell counts during virological successful continuous cART according to CD4 cell count at start. At least 5 patients remaining in follow-up.

	N(%)
Total	5766 (100)
Male	4614 (80)
Transmission risk group	
MSM	3499 (61)
Heterosexual	1866 (32)
Other/unknown	401 (7)
Region of origin	
W-Europe/N-America	3739 (65)
Sub-Saharan Africa	911 (16)
Other	1126 (19)
HCV	
Positive	436 (8)
Unknown	376 (7)
HBV	
Positive	380 (7)
Unknown	244 (4)
CD4 cell count at start (cells/mm^3)	
<50	665 (12)
50-200	1541 (27)
200-350	2405 (42)
350-500	780 (13)
≥500	375 (6)
	Median (IQR)
HIV RNA at start (log$_{10}$ copies/ml)	4.9 (4.4-5.3)
Age at start (years)	40 (33-47)
Number of measurements	9 (5-15)

Table 1. Demographic and clinical characteristics at the start of cART.

	Mean (95% CI) differences in annual CD4 cell changes after starting cART		
	0-6 m	**6-24 m**	**≥24 m**
CD4 cell count			
<50	-95 (-123, -68)	28 (18,37)	7 (2, 12)
50-200	-41 (-61, -21)	7 (0, 14)	2 (-1, 6)
200-350 (ref)	0	0	0
350-500	-1 (-27, 25)	-3 (-12, 7)	-3 (-8, 3)
≥500	-96 (-132, -59)	20 (5, 35)	13 (-21, -5)
Female vs. male	38 (14, 61)	24 (16, 33)	3 (-1, 7)
Region of origin			
West (ref)	0	0	0
SSA	-57 (-84, -31)	-15 (-24, -6)	2 (-2, 7)
Other	-3 (-25, 19)	-1 (-9, 7)	3 (-1, 7)
HIV RNA (copies/ml)			
<10,000	-19 (-45, 8)	-16 (-25, -5)	-2 (-7, 3)
10,000-100,000	0	0	0
≥100,000	47 (28,66)	5 (-2,11)	4 (1, 8)
<50 vs. ≥50 yr	32 (10, 54)	13 (5, 21)	5 (0, 9)
HCV + vs. -	-37 (-65, -8)	-14 (-25, -2)	-3 (-9, 4)

Table 2. Differences in annual changes in CD4 cell count during virological successful continuous cART. West: Western Europe and North America, SSA: Sub Saharan Africa

Conclusions

- Eight years of sustained virological suppression <50 copies/ml on cART, resulted in median CD4 cell counts levels around 800 cells/mm^3 when cART was initiated ≥350 CD4 cells/mm^3.
- CD4 cell count increases between 0-8 years were smaller in patients ≥50 years.

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