

Immunosuppression and HIV Viremia Associated with Increased Atherogenic Cholesterol Concentrations in Older People with HIV



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AIDS 2018 Abstract # TUPEB125

Background

- Dyslipidemia is highly prevalent in HIV-infected populations^{1,2}
- Lower CD4 counts and higher HIV viral loads (VLs) have been associated with unfavorable lipid profiles^{3,4}
- Older HIV-infected persons have greater odds of metabolic disease, subclinical atherosclerosis, and cardiovascular disease (CVD) than is expected due to the independent effects of HIV and age alone⁵⁻⁷
- Factors contributing to high CVD risk among older HIV-infected individuals are not well understood

Objective

- Assess whether associations of CD4 count and HIV VL with serum cholesterol concentrations differed by age

Methods

- Used socio-demographic, clinical, and laboratory data that were documented in outpatient electronic medical record systems from Jan 2011-Jan 2016 and abstracted as part of the DC Cohort study – an ongoing, prospective, multi-center observational cohort study of HIV-infected patients in Washington, DC
- Included patients ≥ 21 years old who had ≥ 1 documented lipid profile with results for CD4 count and HIV VL available within ± 14 days of lipid testing
- Outcome variables: (1) non-HDL-C (calculated as total cholesterol minus HDL-C) and (2) HDL-C (in mg/dL)
- Conducted multivariable linear regression* with generalized estimating equations to model non-HDL-C and HDL-C concentrations
- Assessed significance of interaction terms among CD4 count, HIV VL, and age, followed by stratified analyses
- Statistical significance was set at $p < 0.0125$ after implementing a Bonferroni correction
- Multiply imputed missing data for HIV transmission group (3%), smoking (14%), body mass index (BMI) (2%), and serum albumin concentration (11%)

Results

Table 1. Characteristics of HIV-infected patients with at least one available lipid profile (n=3,912).

	%	%	%	%	
Age, years (median, IQR)	50 (41-56)	Male sex at birth	78%	Protease inhibitor use	47%
<50	52%	Non-Hispanic Black	76%	Current smoker	40%
50-59	34%	CD4 count <200 cells/ μ L	8%	Hypertension	42%
$\geq 60-69$	15%	HIV viral load ≥ 200 copies/mL	18%	Diabetes	14%
				BMI ≥ 30	28%
				Non-HDL-C ≥ 160 mg/dL	19%
				HDL-C <40 mg/dL	28%
				Use of lipid-lowering agent	10%

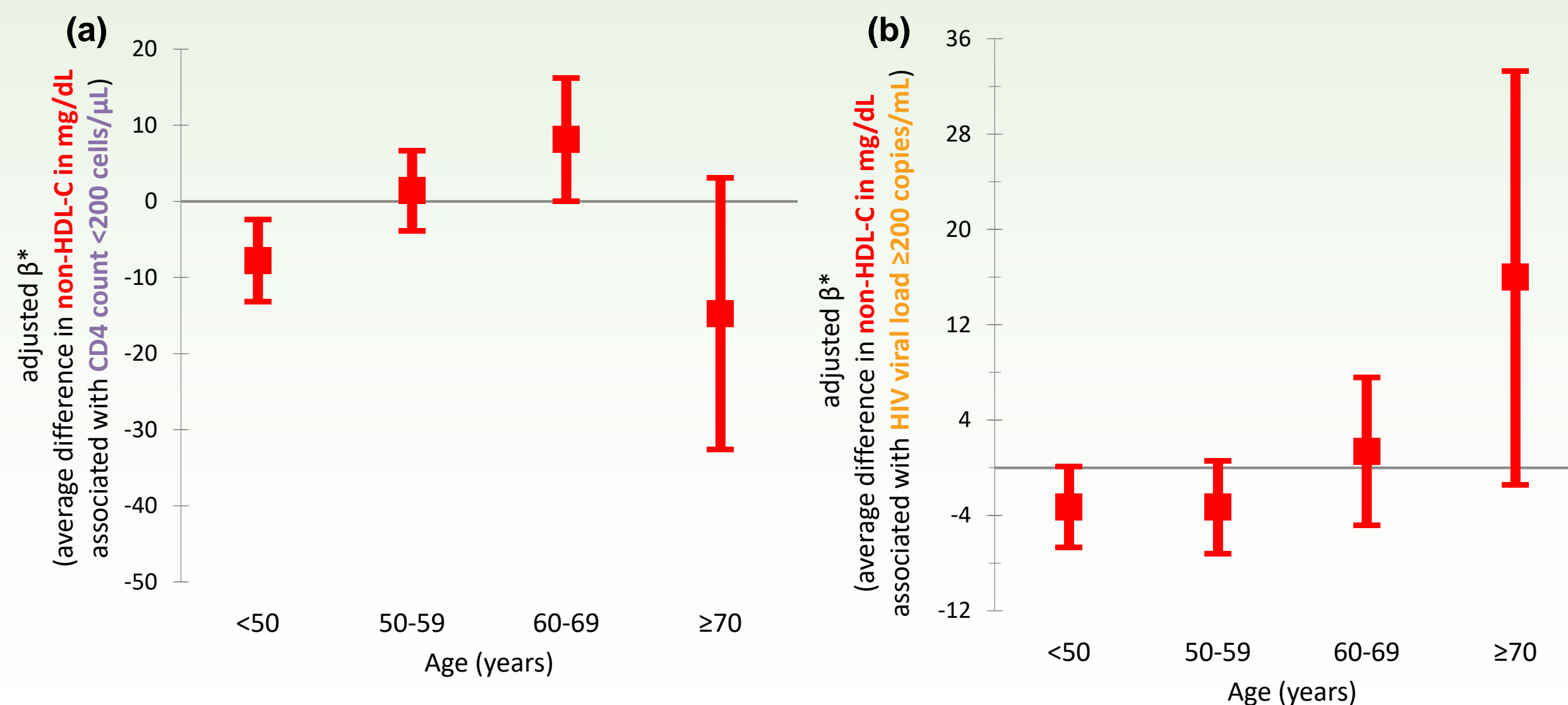
Table 2. Significance of interaction terms among CD4 count, HIV VL, and age when modeling non-HDL-C concentration.

	Adjusted β (95% CI)*	p
Interaction term: CD4 count * age $\div 5$		
CD4 count <200 (vs. >500) cells/ μ L	2.4 (0.8, 3.9)	0.0030
CD4 count 200-500 (vs. >500) cells/ μ L	0.7 (0, 1.5)	0.051
Interaction term: HIV viral load ≥ 200 copies/mL * age $\div 5$	2.4 (1.3, 3.4)	<0.0001
Interaction term: CD4 count * HIV viral load ≥ 200 copies/mL	—	NS

Table 3. Significance of interaction terms among CD4 count, HIV VL, and age when modeling HDL-C concentration.

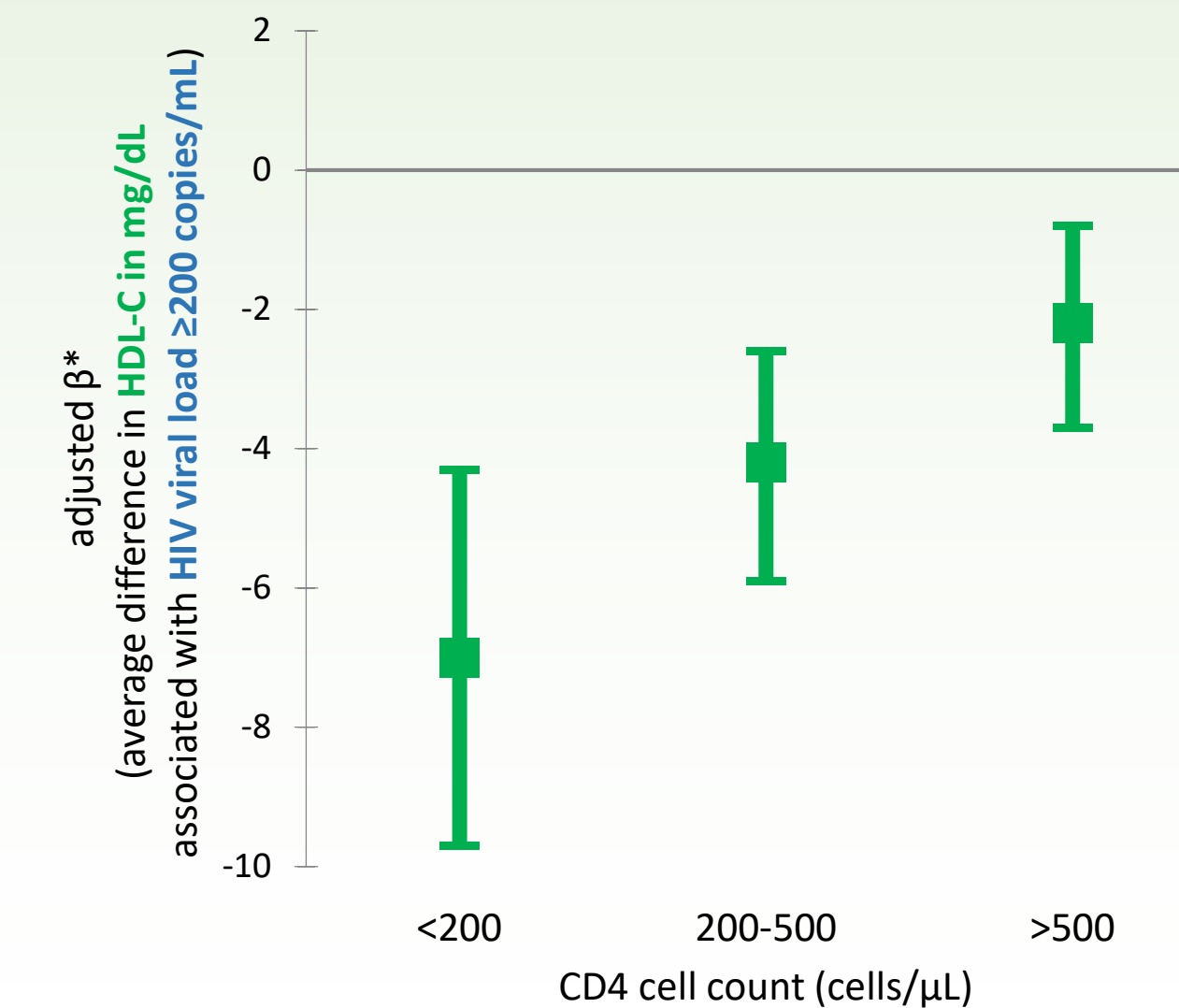
	Adjusted β (95% CI)*	p
Interaction term: CD4 count * age $\div 5$	—	NS
Interaction term: HIV viral load ≥ 200 copies/mL * age $\div 5$	—	NS
Interaction term: CD4 count * HIV viral load ≥ 200 copies/mL		
CD4 count <200 (vs. >500) cells/ μ L	-4.9 (-7.8, -1.9)	0.0013
CD4 count 200-500 (vs. >500) cells/ μ L	-1.5 (-3.5, 0.6)	0.17

Figure 1. Associations of (a) CD4 count and (b) HIV VL with non-HDL-C stratified by age group.



*Results were adjusted for CD4 cell count, HIV viral load, age, sex, race/ethnicity, HIV transmission group, history of smoking, depression, anxiety/stress disorder, hypertension, diabetes, BMI category, hepatitis C infection, chronic kidney disease, serum albumin, length of time since HIV diagnosis, history of AIDS diagnosis, current antiretroviral regimen class, and the current use of a lipid-lowering agent.

Figure 2. Association between HIV VL and HDL-C stratified by CD4 count.



Summary of Results

Non-HDL-C

- Associations between CD4 cell count and HIV VL and non-HDL-C concentration were modified by one's age
- After adjusting for confounding factors, the non-HDL-C concentration associated with having a low CD4 count or high VL was generally higher with increasing age

HDL-C

- No age differences were detected for associations of CD4 count or HIV VL with HDL-C
- Having a high VL was associated with lower concentrations of HDL-C and this association was stronger among patients with lower CD4 counts

Conclusions

- We detected an age-modified relationship between immunosuppression and viremia and concentrations of atherogenic cholesterol
- The potential adverse effect of having uncontrolled viremia on HDL-C concentrations might be more pronounced in the setting of immunosuppression
- These patterns might contribute to our growing understanding of the high risk of dyslipidemia and CVD observed among persons aging with HIV

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