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

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AIDS 2018 Abstract # TUPE125

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

Acknowledgements and Funding

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References


Background
• Dyslipidemia is highly prevalent in HIV-infected populations1,2
• Lower CD4 counts and higher HIV viral loads (VLs) have been associated with unfavorable lipid profiles3,4
• Older HIV-infected persons have greater odds of metabolic disease, subclinical atherosclerosis, and cardiovascular disease (CVD) than expected due to the independent effects of HIV and age alone5,6
• 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 (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
• Multiple 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).

<table>
<thead>
<tr>
<th>Age Range</th>
<th>%</th>
<th>Male sex</th>
<th>%</th>
<th>Male sex</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>52%</td>
<td>Non-Hispanic Black</td>
<td>76%</td>
<td>Current smoker</td>
<td>40%</td>
</tr>
<tr>
<td>50-59</td>
<td>34%</td>
<td>CD4 count &gt;100 cells/µL</td>
<td>8%</td>
<td>Hypertension</td>
<td>42%</td>
</tr>
<tr>
<td>≥60</td>
<td>15%</td>
<td>HIV viral load &gt;200 copies/mL</td>
<td>18%</td>
<td>Diabetes</td>
<td>15%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Interaction Term</th>
<th>Adjusted β (95% CI)*</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4 count * age ≥50</td>
<td>2.4 (0.8, 3.9)</td>
<td>0.0005</td>
</tr>
<tr>
<td>CD4 count &gt;100 vs. &gt;500 cells/µL</td>
<td>0.7 (0.1, 1.5)</td>
<td>0.051</td>
</tr>
<tr>
<td>HIV viral load &gt;200 vs. &gt;500 cells/µL</td>
<td>2.4 (1.3, 3.4)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Interaction Term</th>
<th>Adjusted β (95% CI)*</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4 count * HIV viral load ≥200 copies/mL</td>
<td>1.5 (3.5, 0.6)</td>
<td>0.17</td>
</tr>
</tbody>
</table>

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

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

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