Introduction

• Non-communicable diseases are an increasingly important component of the clinical management of HIV-infected patients who have achieved virologic suppression on antiretroviral therapy (ART).
• Large cohort studies and clinical studies of subclinical atherosclerosis demonstrate significantly increased rates of acute myocardial infarction (AMI).
• Accumulating data suggest broader cardiovascular and cerebrovascular endpoints are also increased among HIV compared with control groups.
• Risk factors for cardiovascular disease (CVD) among HIV-infected patients likely differ from those of the general population, with contributions from HIV-related inflammatory factors as well as traditional CVD risk factors.
• Patient subgroups at high CVD risk may differ in the setting of HIV infection.
• Preliminary data indicate an increased relative risk of AMI and stroke among young and female HIV-infected patients.
• We assessed major adverse cardiac event (MACE) rates individually and as a composite outcome approximating outcomes of large clinical trials in the general population, using a large observational clinical care cohort of HIV and matched control patients.
• We conducted age- and gender-stratified analyses to identify at-risk subgroups among the HIV population.

Hypotheses

• Incidence rates of a composite CVD endpoint will be increased among HIV-infected patients compared with matched controls.

• The CVD incidence rate ratio comparing HIV-infected to control patients will be greater for women and for younger age groups.

Methods

• Partners HealthCare System HIV longitudinal cohort, comprised of Brigham & Women’s Hospital and Massachusetts General Hospital
• 3,109 HIV-infected and 25,237 non-HIV-infected control patients matched on age, gender, and race.
• Followed 4,874 person-years [PYs] for HIV-4 years (106,885 PYs) for control patients
• Data derived from the Research Patient Data Registry, a clinical care data registry which includes comprehensive clinical information for over 4.5 million patients
• Observation period 2000 to 2009
• Data censored at first event, last encounter, or December 31, 2009
• All patients age 38 at start of observation
• Composite CVD endpoint ascertainment as documentation of ICD-9-CM or CPT codes myocardial infarction (ICD 410), stroke (ICD 433-443), angina (ICD 411.11 related only) or coronary revascularization (CPT 92892, 92894, 92880, 92891, 92995, 92996, 92290, 02921)
• Individual and composite incidence rate ratios calculated overall and after stratification by age and sex

Results

Table 1: Patient characteristics. Demographics, and clinical characteristics of a HIV-infected cohort

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>4672</td>
<td>27944</td>
</tr>
<tr>
<td>Male (%)</td>
<td>5134 (11.3)</td>
<td>33812 (14.1)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>4538 (8.0)</td>
<td>22502 (9.5)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>4672</td>
<td>27944</td>
</tr>
<tr>
<td>Male (%)</td>
<td>5134 (11.3)</td>
<td>33812 (14.1)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>4538 (8.0)</td>
<td>22502 (9.5)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>4672</td>
<td>27944</td>
</tr>
<tr>
<td>Male (%)</td>
<td>5134 (11.3)</td>
<td>33812 (14.1)</td>
</tr>
<tr>
<td>Female (%)</td>
<td>4538 (8.0)</td>
<td>22502 (9.5)</td>
</tr>
</tbody>
</table>

Table 2: Incidence Rate Ratios. Ratios of incidence rates comparing HIV control to HIV cohort groups are shown according to gender, age group, and CVD outcome.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMI</td>
<td>1.5+</td>
<td>1.9+</td>
</tr>
<tr>
<td>Stroke</td>
<td>1.5</td>
<td>1.3</td>
</tr>
</tbody>
</table>
| CVD Incidence Rates by Gender. For the overall group and each gender, incidence rates are shown comparing HIV to control groups according to age group.

Conclusions

• In a clinical care cohort of HIV-infected and matched control patients, major adverse cardiac events including myocardial infarction, stroke, angiography, and coronary revascularization were more common among HIV-infected compared with matched control patients.
• The relative increase of approximately 50 percent for HIV was seen for the composite endpoint as well as the individual endpoints of AMI and stroke, corroborating data from earlier time periods from this and other cohorts.
• The pattern of increased rates in HIV was observed for both genders and all age groups.
• The increase in incidence rates comparing HIV to control groups was relatively greater for females versus males for all three outcomes (composite, AMI, and stroke).
• The increase in relative risk rates comparing HIV to control groups was relatively greater for younger age groups for all three outcomes (composite, AMI, and stroke).
• The relatively greater risk for female and younger patients may reflect the different distribution of CVD risk factors in HIV, with important contributions from non-traditional risk factors reflecting HIV-related immune dysregulation.
• Targeted interventions are needed to prevent CVD in HIV disease, particularly among patients not traditionally considered to be at high-risk.

Acknowledgements

The authors are grateful to Shawn Murphy, MD, PhD (MGH Laboratory of Computer Science) and the Partners HealthCare RDRG program for facilitating use of their database and to Kimberly Wong for assistance with poster design.