Ischemic Heart Disease in Patients with HIV

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Objectives

• Address the question: is HIV a risk factor for Coronary artery disease?

• Discuss the possible mechanisms via which HIV exerts its risk

• Review the clinical presentation of IHD in HIV

• Discuss the implications of HIV status on the management and outcomes of Acute Coronary Syndromes
HIV and CAD

• Reports of young HIV infected patients presenting acute MI emerged early in the HIV epidemic
Association Between HIV Infection, Antiretroviral Therapy, and Risk of Acute Myocardial Infarction: A Cohort and Nested Case–Control Study Using Québec’s Public Health Insurance Database

Madeleine Durand, MD, MSc, FRCPC,* Odile Sheehy, MSc,† Jean-Guy Baril, MD,‡ Jacques Lelorier, MD, PhD, FRCPC, FISPE,† and Cécelie L. Tremblay, MD, FRCPC;

Epidemiological Evidence for Cardiovascular Disease in HIV-Infected Patients and Relationship to Highly Active Antiretroviral Therapy

Judith S. Currier, MD, Co Chair, Jens B. Lundgren, MD, PhD, Co Chair, Andre’ van Cauwenbergh, MD, Daniel Klein, MD; Caroline A. Sabin, PhD; Paul E. Sax, MD; Jeffrey T. Schouten, MD; Marek Smieja, MD, PhD; for Working Group 2

Article Info

Abstract

RESEARCH ARTICLE

Risk of Myocardial Infarction in Parents of HIV-infected Individuals: a population-based study

Lars H. Omland, Court Pedersen, Jan Gerstoft, Gitte Kronborg, Janne Jensen, and Niels Obe

HIV Infection and Coronary Heart Disease: An Intersection of Epidemics

Virginia A. Triant

No Risk of Myocardial Infarction Associated With Initial Antiretroviral Treatment Containing Abacavir: Short and Long-Term Results from ACTG A5001/ALLRT

Heather J. Ribando, Constance A. Benson, Yu Zheng, Susan L. Koletar, Ann C. Collier, Judith J. Lok, Marlene Smuszynski, Ronald J. Bosch, Barbara Bastow, and Jeffrey T. Schouten, for the ACTG A5001/ALLRT Protocol Team
HIV and CAD

• Is HIV a marker for a population subset at high risk for MI?

• Is HIV itself a specific unique risk factor for CAD?
Increased risk of myocardial infarction in HIV-infected patients in France, relative to the general population

Sylvie Lang\textsuperscript{a,b}, Murielle Mary-Krause\textsuperscript{a,b}, Laurent Cotte\textsuperscript{c}, Jacques Gilquin\textsuperscript{d}, Marialuisa Partisani\textsuperscript{e}, Anne Simon\textsuperscript{f}, Franck Boccara\textsuperscript{g}, Annie Bingham\textsuperscript{h,i}, Dominique Costagliola\textsuperscript{a,b,j}, for the French Hospital Database on HIV-ANRS CO4

Prospective Cohort 75,000 HIV+ pts
Compare MI incidence vs
Age sex matched controls
6 years of follow up
Total of 360 MI s
Overall MI incidence
1.2 /1000 patient years
Relative risk of cardiovascular disease among people living with HIV: a systematic review and meta-analysis

FM Islam, J Wu, J Jansson and DP Wilson

The Kirby Institute, Faculty of Medicine, University of New South Wales, Sydney, NSW, Australia
Available data suggest several factors:

- Higher prevalence of conventional risk factors
- Chronic inflammation
- Immune activation & viral replication
- Hypercoagulability
- The role of cART
D:A:D: Incidence of MI With Exposure to Combination ART

Duration of Combination Antiretroviral Therapy Is Associated With a Small Increase in Incident CVD

RR per Year of ART
- Overall: 1.17
- Men: 1.14
- Women: 1.38

Incidence of MI per 1000 Patient-Year

Exposure to ART (Years)
- None
- < 1
- 1-2
- 2-3
- 3-4
- 4-5
- 5-6
- > 6

HIV & CAD

• It's been nearly 40 years since those early reports.

• cART has turned HIV into a chronic disease with near normal life expectancy.

• Predictions were that IHD would be the biggest cause of death...........
Trends in underlying causes of death in people with HIV from 1999 to 2011 (D:A:D): a multicohort collaboration


Lancet 2014; 384: 241-48

Figure 1: Most common causes of death in people with HIV
CVD=cardiovascular disease.
What is the African Experience?
• SSA is home to 70% of the 37 million people with HIV

• SA has close to 6.5 million with > 2 million now on cART
Contribution of the human immunodeficiency virus/acquired immunodeficiency syndrome epidemic to de novo presentations of heart disease in the Heart of Soweto Study cohort

Karen Sliwa¹,²,³, Melinda J. Carrington²,⁴, Anthony Becker², Friedrich Thienemann⁵,⁶,⁷, Mpiko Ntsikhe³, and Simon Stewart¹,²,⁴*

European Heart Journal (2012) 33, 866–874
5500 patients/12months

4960 (no HIV)

540 HIV seropositive

Mean age 40±14
62% women
54% HAART

European Heart Journal (2012) 33, 866–874
Figure 1  Primary diagnosis of all human immunodeficiency virus-positive cases (n = 518).

European Heart Journal (2012) 33, 866–874
Risk Factors Associated With Myocardial Infarction in Africa
The INTERHEART Africa Study

Krisela Steyn, MD; Karen Sliwa, MD; Steven Hawken, MSc; Patrick Commerford, FCP(SA); Churchill Onen, FRCP(Lond); Albertino Damasceno, MD, PhD; Stephanie Ounpuu, PhD; Salim Yusuf, DPhil, FRCP; for the INTERHEART Investigators in Africa

HIV/AIDS

(Circulation. 2005;112:3554-3561.)
### Effect of Individual Risk Factors

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Controls, % (n=785)</th>
<th>Cases, % (n=578)</th>
<th>OR (95% CI)</th>
<th>Heterogeneity P*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male sex</td>
<td>64.6</td>
<td>66.6</td>
<td>...</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Hypertension, self-reported</td>
<td>18.8</td>
<td>42.3</td>
<td>3.44 (2.64, 4.48)</td>
<td>0.0023</td>
</tr>
<tr>
<td>Diabetes</td>
<td>7.6</td>
<td>23.6</td>
<td>3.55 (2.53, 4.99)</td>
<td>0.23</td>
</tr>
<tr>
<td>Current smoker</td>
<td>38.1</td>
<td>52.3</td>
<td>2.42 (1.86, 3.15)</td>
<td>0.017</td>
</tr>
<tr>
<td>Current/former smoker</td>
<td>56.3</td>
<td>72.3</td>
<td>2.17 (1.70, 2.77)</td>
<td>0.90</td>
</tr>
<tr>
<td>Exercise</td>
<td>17.0</td>
<td>15.0</td>
<td>0.88 (0.65, 1.20)</td>
<td>0.15</td>
</tr>
<tr>
<td>Alcohol</td>
<td>26.8</td>
<td>22.2</td>
<td>0.66 (0.50, 0.87)</td>
<td>0.07</td>
</tr>
<tr>
<td>Fruits and vegetables, daily</td>
<td>39.4</td>
<td>37.4</td>
<td>0.87 (0.63, 1.18)</td>
<td>0.19</td>
</tr>
<tr>
<td>Depression</td>
<td>22.3</td>
<td>31.8</td>
<td>1.73 (1.34, 2.25)</td>
<td>0.23</td>
</tr>
<tr>
<td>Stress, permanent</td>
<td>4.5</td>
<td>9.6</td>
<td>2.92 (1.76, 4.85)</td>
<td>0.43</td>
</tr>
</tbody>
</table>

5 Traditional risk factors accounted for 90% of the risk
HIV not routinely tested ...........
Acute Coronary Syndromes in Treatment-Naïve Black South Africans with Human Immunodeficiency Virus Infection

A.C. BECKER, M.B.B.Ch., F.C.P.,¹ K. SLIWA, M.D., Ph.D., F.E.S.C.,¹
S. STEWART, Ph.D., F.C.S.A.N.Z., N.F.E.S.C., F.A.H.A.,¹,² E. LIBHABER, Ph.D.,¹
and M.R. ESSOP, M.B.B.Ch., M.R.C.P., F.C.P., F.A.C.C., F.R.C.P.¹

From the ¹Division of Cardiology, Chris Hani Baragwanath Hospital and University of the Witwatersrand, Johannesburg, South Africa; and ²Preventative Cardiology, Baker IDI Heart and Diabetes Research Institute, Melbourne, Australia
Table 1. Clinical Features of HIV Patients and Controls with ACS

<table>
<thead>
<tr>
<th>demographic profile</th>
<th>HIV+ve (n = 30)</th>
<th>HIV-ve (n = 30)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black African n (%)</td>
<td>30 (100%)</td>
<td>30 (100%)</td>
<td>1.0</td>
</tr>
<tr>
<td>mean age (years)</td>
<td>43 ± 7</td>
<td>54 ± 13</td>
<td>0.0004</td>
</tr>
<tr>
<td>Men (%)</td>
<td>20 (67%)</td>
<td>18 (60%)</td>
<td>0.79</td>
</tr>
<tr>
<td>Coronary Risk Factors n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>smoking (%)</td>
<td>22 (73%)</td>
<td>10 (33%)</td>
<td>0.002</td>
</tr>
<tr>
<td>diabetes mellitus (%)</td>
<td>1 (3%)</td>
<td>7 (23%)</td>
<td>0.05</td>
</tr>
<tr>
<td>hypertension (%)</td>
<td>7 (23%)</td>
<td>23 (77%)</td>
<td>0.0001</td>
</tr>
<tr>
<td>total cholesterol (mmol/L)</td>
<td>3.6 ± 1.0</td>
<td>4.6 ± 1.4</td>
<td>0.006</td>
</tr>
<tr>
<td>LDL cholesterol (mmol/L)</td>
<td>2.2 ± 0.9</td>
<td>3.0 ± 1.2</td>
<td>0.006</td>
</tr>
<tr>
<td>HDL cholesterol (mmol/L)</td>
<td>0.8 ± 0.3</td>
<td>1.1 ± 0.4</td>
<td>0.001</td>
</tr>
<tr>
<td>triglycerides (mmol/L)</td>
<td>1.4 ± 0.8</td>
<td>1.1 ± 0.4</td>
<td>0.35</td>
</tr>
<tr>
<td>multiple risk factors</td>
<td>8 (27%)</td>
<td>18 (60%)</td>
<td>0.0182</td>
</tr>
<tr>
<td>other coronary risk factors</td>
<td>2 (7%)</td>
<td>16 (53%)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Clinical Features

<table>
<thead>
<tr>
<th></th>
<th>HIV+ve (n = 30)</th>
<th>HIV-ve (n = 30)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>systolic/diastolic blood pressure (mmHg)</td>
<td>132 ± 31/ 86 ± 22</td>
<td>145 ± 37/ 89 ± 18</td>
<td>0.18 / 0.32</td>
</tr>
<tr>
<td>pulse rate (beats/min)</td>
<td>91 ± 22</td>
<td>91 ± 29</td>
<td>0.9</td>
</tr>
<tr>
<td>body mass index (kg/m²)</td>
<td>25 ± 5</td>
<td>28 ± 5</td>
<td>0.01</td>
</tr>
<tr>
<td>waist to hip ratio</td>
<td>0.91 ± 0.06</td>
<td>0.95 ± 0.05</td>
<td>0.03</td>
</tr>
<tr>
<td>abdominal circumference (cm)</td>
<td>85 ± 10</td>
<td>100 ± 15</td>
<td>0.0003</td>
</tr>
</tbody>
</table>
Patients with HIV had a more “pro-thrombotic profile”

Lower protein C
Higher factor VII levels
Increased anti-phospholipid antibodies
Implications for CAD Prevention and Management of HIV infected patients
i. Should we screen all our HIV+ patients for traditional CVD risk factors?

ii. Should we screen all of our patients presenting with Acute Coronary Syndrome for HIV?

iii. Are there implications for choice of cART?

iv. Are there management or outcome implications for patients who do present with Acute Coronary Syndromes?
Acute coronary syndrome in human immunodeficiency virus-infected patients: characteristics and 1 year prognosis

Franck Bocara¹,², Murielle Mary-Krause³,⁴, Emmanuel Teiger⁵, Sylvie Lang¹, Pascal Lim⁶, Karim Wahbi⁷, Farzin Beygui⁸, Olivier Milleron⁹, Philippe Gabriel Steg¹⁰,¹¹,¹², Christian Funck-Brentano¹³,¹⁴,¹⁵, Michel Slama¹⁶, Pierre-Marie Girard¹⁷, Dominique Costagliola³,⁴,¹⁸, and Ariel Cohen¹*, on behalf of the PACS Investigators (Prognosis of Acute Coronary Syndrome in HIV-infected patients)

FRENCH STUDY
Compared in hospital and 1 year
Outcomes between approximately
120 HIV+ and 180 HIV –
propensity matched patients
presenting with ACS
HR = 1.4 (95% CI, 0.6–3.0), \( P = 0.5012^* \)
Case Report

Acute Spontaneous Coronary Artery Thrombosis as Initial Presentation of HIV Infection in a Young Man

James Kayima,1,2 Wilson Nyakoojo,2 Damalie Nakanjako,1,3 Marco A. Costa,4 Christopher T. Longenecker,4 and Daniel I. Simon4

1Department of Medicine, School of Medicine, College of Health Sciences, Makerere University, P.O. Box 7072, Kampala, Uganda
2Uganda Heart Institute, Ward 1C, Mulago Hospital Complex, P.O. Box 7051, Kampala, Uganda
3Infectious Disease Institute, Makerere University, P.O. Box 22418, Kampala, Uganda
4Harrington Heart and Vascular Institute, University Hospitals Case Medical Center, Case Western Reserve University, School of Medicine, 11100 Euclid Avenue, Cleveland, OH 44106, USA
- 33 year old
  - HIV infected
- CD4 >500
- Given streptokinase at 6 hours for Anterior STEMI
- Persistent pain non-resolution of ST segments
HIV+ with AMI

Proceed to PCI?

Intense antithrombotic therapy with delayed PCI?

Thrombus Aspiration?

Intra coronary lytic?
Safety and Efficacy of Intense Antithrombotic Treatment and Percutaneous Coronary Intervention Deferral in Patients With Large Intracoronary Thrombus

Mauro Echavarría-Pinto, MD, Ricardo Lopes, MD, Tamara Gorgadze, MD, Nieves Gonzalo, MD, PhD, Rosana Hernández, MD, PhD, Pilar Jiménez-Quevedo, MD, PhD, Fernando Alfonso, MD, PhD, Camino Bañuelos, MD, Ivan J Nuñez-Gil, MD, PhD, Borja Ibañez, MD, PhD, Cristina Fernández, MD, PhD, Antonio Fernandez-Ortiz, MD, PhD, Eulogio García, MD, Carlos Macaya, MD, PhD, and Javier Escaned, MD, PhD.*

Delayed PCI and intense ATT is safe and efficacious in stable patients with large thrombus burden avoids No reflow, acute stent thrombosis, Hemodynamic collapse of immediate PCI
Summary and Conclusions

• HIV does increase the risk of Acute Myocardial Infarction

• Good evidence of premature accelerated atherosclerosis
  – Traditional Risk factors
  – Small additional risk conferred predominant by PIs

• Prevention with control of traditional RF is most important and has led to reduction in IHD related mortality

• Beware the large thrombus burden and consider intense anticoagulation and delayed PCI as strategy for Acute MI in stable patients
Enkosi!