Myocardial Infarction Risk in the NA-ACCORD Compared to MESA and ARIC

Daniel R. Drozd[1], Mari M. Kitahata[1], Keri N. Althoff[2], Susan R. Heckbert[3], Matthew J. Budoff[4], Frank J. Palella[5], Daniel B. Klein[6], Amy Justice[7], Stephen J. Gange[2], Richard D. Moore[8], Heidi M. Crane[1]
for the North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD) of IeDEA

[1]University of Washington, Division of Allergy & Infectious Diseases, Seattle, WA; [2]Johns Hopkins Bloomberg School of Public Health, Baltimore, MD; [3]University of Washington School of Public Health, Seattle, WA; [4]Los Angeles Biomedical Research Institute, Harbor-University of California Los Angeles Medical Center, Torrance, CA; [5]Division of Infectious Diseases, Northwestern University, Chicago, IL; [6]Kaiser Permanente, Division of Infectious Diseases, San Leandro, CA; [7]Veterans Affairs Connecticut Healthcare System and Yale Schools of Medicine and Public Health, New Havent, CT; [8]Johns Hopkins University, Department of Medicine, Baltimore, MD

Abstract 1768
Contact:
Dan Drozd, MD MSc
University of Washington
Email: ddrozd@uw.edu

Background

- HIV-infected individuals may be at increased risk for atherosclerosis and myocardial infarction (MI),[1-4] but the role of HIV in the pathogenesis of atherosclerosis is unclear
- Identifying an appropriate HIV-uninfected control group is challenging due to differences in traditional CVD risk factors
- The Universal Definition of MI (UDMI)[5] classifies MIs by underlying pathophysiology into classic primary (type 1) MIs due to atherothrombotic plaque rupture and secondary (type 2) MIs due to supply-demand mismatch. Prior studies in HIV have not been able to differentiate MIs by type[5]
- The Multi-Ethnic Study of Atherosclerosis (MESA) and Atherosclerosis Risk in Communities (ARIC) cohorts are NHLBI-funded cohorts designed to assess traditional and novel atherosclerotic cardiovascular disease (ASCVD) risk factors in the general population
- We calculated incidence rates of MIs among HIV-infected individuals in NA-ACCORD through 2013 and MI rates in MESA and ARIC along with adjusted incidence rate ratios (aIRR)

Methods

NA-ACCORD

- Potential MIs were centrally ascertained in 7 NA-ACCORD cohorts between 1995-2013 per modified MESA criteria and classified as type 1 (T1MI) or type 2 (T2MI) by a panel of physicians as previously reported[6]
- We followed individuals from study entry (baseline) defined as the later of entry into care, cohort inception, or cohort MI observation start date until incident MI, death, or administrative censoring
- T2MIs were excluded in order to focus on atherosclerotic T1MI and because of the low frequency of T2MIs in the general population

MESA and ARIC

- MESA and ARIC events were defined per cohort protocols and prevalent events were excluded
- MESA events occurred between 2000-2008 and ARIC between 1987-2010

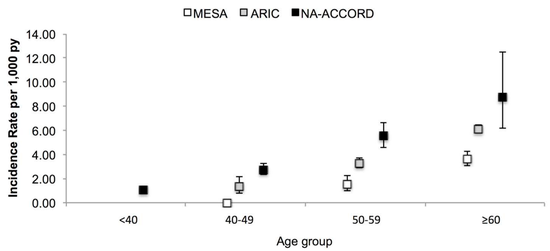
Analysis

- Incidence rates (IRs) per 1,000 person-years (PY) and adjusted rate ratios (aIRRs) and 95% confidence intervals ([,]) were estimated using Poisson regression adjusted for age, sex, race, and smoking status comparing NA-ACCORD to MESA and ARIC

Table 1. Baseline characteristics of MESA, ARIC and NA-ACCORD participants

Characteristic	MESA N=6,814 n %	ARIC N=14,308 n %	NA-ACCORD N=29,212 n %
Age			
<40	0 0%	0 0%	12,620 43%
40-49	883 13%	3,869 27%	10,533 36%
50-59	2,032 30%	7,207 50%	4,700 16%
≥60	3,899 57%	3,232 23%	1,059 4%
Missing	0 0%	0 0%	0 0%
Sex			
Male	3,213 47%	6,307 44%	23,284 80%
Female	3,601 53%	8,001 56%	5,628 19%
Missing	0 0%	0 0%	0 0%
Race			
Non-black	4,922 72%	10,565 74%	16,448 56%
Black	1,892 28%	3,743 26%	10,683 37%
Missing	0 0%	0 0%	1,781 6%
Smoking			
Ever	3,366 49%	8,285 58%	22,130 76%
Never	3,426 50%	6,012 42%	6,782 23%
Missing	22 0%	11 0%	0 0%

Figure 1. *Incidence rates by age per 1,000 person years*



Results

- We observed 335 T1MIs in 29,212 individuals in 130,594 PYs of follow-up in NA-ACCORD; 156 MIs in 6,814 individuals in 54,971 PYs of follow-up in MESA; and 1,448 MIs in 14,308 individuals in 281,284 PYs of follow-up in ARIC
- NA-ACCORD participants were younger and more likely to be of black race and male than MESA and ARIC participants (Table 1)
- MESA participants were older and smoked less than ARIC participants
- HIV infection (NA-ACCORD cohort) and traditional CVD risk factors all were associated with increased MI risk

Table 2. Adjusted incidence rate ratios (aIRR) and 95% confidence intervals comparing NA-ACCORD to MESA and ARIC

Variable	aIRR [95% CI]	
	MESA	ARIC
Cohort		
NA-ACCORD	**2.44 [1.84, 3.24]**	**1.30 [1.09, 1.65]**
Age		
40-49	1.00	1.00
50-59	**2.59 [1.91, 3.51]**	**2.55 [1.89, 3.45]**
≥60	**5.09 [3.75, 6.94]**	**5.19 [3.85, 7.00]**
Sex		
Male	1.00	1.00
Female	**0.57 [0.45, 0.72]**	**0.62 [0.56, 0.69]**
Race		
Non-black	1.00	1.00
Black	0.85 [0.70, 1.03]	**1.14 [1.03, 1.27]**
Smoking		
Never	1.00	1.00
Ever	**1.38 [1.12, 1.71]**	**1.50 [1.35, 1.67]**

Conclusions

- HIV-infected individuals in NA-ACCORD had significantly higher incidence of MI compared to the general population in both MESA and ARIC after adjusting for demographic risk factors and smoking status
- The magnitude of the increased risk associated with HIV infection varied when NA-ACCORD was compared to MESA and ARIC, likely because MESA more stringently excluded individuals with any baseline CVD risk factors highlighting the importance of selecting an appropriate HIV uninfected control group
- We were unable to control for other traditional CVD risk factors including hypertension and dyslipidemia in this analysis

1. Silverberg MJ, et al. *JAIDS* 2014 2. Freiberg MS, et al. *JAMA Int Med* 2013 3. Lang S, et al. *AIDS* 2010 4. Triant VA, et al. *J Clin Endocrinol Metab* 5. Thygesen K, et al. *J Am Coll Cardiol* 6. Drozd DR, et al. *CROI*. 2015, Seattle, WA

Acknowledgments

This work was supported by grants U01-AI069918, U01-AA013566, U24-AA020794, U01-AA020790, U01-AI31834, U01-AI34989, U01-AI34993, U01-AI34994, U01-AI35004, U01-AI35039, U01-AI35040, U01-AI35041, U01-AI35042, UM1-AI35043, U01-AI37613, U01-AI37984, U01-AI38855, U01-AI38858, U01-AI42590, U01-AI68634, U01-AI68636, U01-AI69432, U01-AI69434, U01-DA036935, U01-HD32632, U10-EY08052, U10-EY08057, U10-EY08067, UL1-RR024131, UL1-TR000083, F31-DA037788, G12-MD007583, K01-AI071754, K01-AI093197, K23-EY013707, K24-DA00432, K24-AI065298, KL2-TR000421, MO1-RR-000052, N02-CP55504, P30-AI027763, P30-AI094189, P30-AI27757, P30-AI27767, P30-AI036219, P30-AI50410, P30-AI54999, P30-MH62246, R01-AA16893, R01-CA165937, R01-DA04334, R01-DA11602, R01-DA12568, R24-AI067039, R56-AI102622, R56-HL126538, U54-MD007587, Z01-CP010214, and Z01-CP010176 from the National Institutes of Health, USA; contract CDC200-2006-18797 from the Center's for Disease Control and Prevention, USA; contract 900477113 from the Agency for Healthcare Research and Quality, USA; contract 90051652 from the Health Resources and Services Administration, USA; grants TGF-96118, HCP-97105, CBR-86906, CBR-94036 from the Canadian Institutes of Health Research, Canada; Canadian Institutes of Health Research (CIHR) New Investigator award (A. Burchell); Ontario Ministry of Health and Long Term Care; and the Government of Alberta, Canada. Additional support