

Sex Disparities of Myocardial Infarction in Individuals with HIV across Europe and Australia: a Multinational Cohort Study

Nadine Jaschinski¹, Joanne Reekie¹, Bastian Neesgaard¹, Inka Aho², Huldrych Günthard^{3,4}, Alexander Egle⁵, Ferdinand Wit⁶, Clara Lehmann⁷, Cristina Mussini⁸, Antonella Castagna⁹, Charlotte Martin¹⁰, Josip Begovac¹¹, Jan-Christian Wasmuth¹², Daniela Rojas Castro¹³, Jean van Wyk¹⁴, Megan Dunbar¹⁵, Lital Young¹⁶, Jasmina Trajanovska¹⁷, Irene Abela³, Elena Sohani¹⁸, Kathy Petoumenos¹⁹, Franck Boccaro²⁰, Lene Ryom^{1,21,22}

¹CHIP, Rigshospitalet, University of Copenhagen, Copenhagen, Denmark; ²Division of Infectious Diseases, Helsinki University Hospital, Helsinki, Finland; ³Swiss HIV Cohort Study (SHCS), University of Zurich, 8001 Zurich, Switzerland; ⁴Institute of Medical Virology, University of Zurich, 8001 Zurich, Switzerland; ⁵3rd Paracelsus Medical University, Salzburg, Austria; ⁶RESPOND Therapy Evaluation in the Netherlands (ATHENA) cohort, HIV Monitoring Foundation, Amsterdam, the Netherlands; ⁷Department of Internal Medicine, Faculty of Medicine and University Hospital Cologne, Cologne, Germany; ⁸Modena HIV Cohort, Università Degli Studi Di Modena and Reggio Emilia, 41125 Modena, Italy; ⁹San Raffaele Scientific Institute, Università Vita-Salute San Raffaele, Milano, Italy; ¹⁰CHU Saint-Pierre, Centre de Recherche en Maladies Infectieuses; ¹¹University Hospital for Infectious Diseases, Zagreb, Croatia; ¹²University Hospital Bonn, Bonn, Germany; ¹³AIDS Treatment Group, 1000 Brussels, Belgium; ¹⁴Viv Healthcare, Research Triangle Park, Durham, NC 27709, USA; ¹⁵Gilead Science, Foster City, CA 94404, USA; ¹⁶Merck Sharp & Dohme, Rahway, NJ 07065, USA a.s.b.l., Brussels, Belgium; ¹⁷University clinic for infectious diseases & febrile conditions, Skopje, North Macedonia; ¹⁸University of Vienna; ¹⁹AIDS Treatment Group, 1000 Brussels, Belgium; ²⁰Viv Healthcare, Research Triangle Park, Durham, NC 27709, USA; ²¹Gilead Science, Foster City, CA 94404, USA; ²²Department of Infectious Diseases, Hvidovre University Hospital, Copenhagen, Denmark; ²³Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark

Background and Purpose

- Women globally represent >50% of people with HIV and face a myocardial infarction (MI) hazard twice that of women without HIV¹
- Prior studies on MI in women with HIV raised concerns about potential disparities in cardiovascular (CV) care², although concluded several years ago or are limited to a single country
- Using data from a large European/Australian cohort, this study characterised MI presentation and management in women and men with HIV

Methods

- RESPOND: Multinational cohort collaboration with rigorous validation of MIs and systematic CV risk factor ascertainment³
- RESPOND participants aged >18 years were followed from baseline (latest of 1 Jan 2012 or local cohort enrolment) until the first type I MI, death, last follow-up, or 31 Dec 2023
- In women and men with HIV, descriptive statistics summarised:
 - Clinical presentation at MI
 - Risk factors at MI
 - MI management

Results

- A total of 37,930 people with HIV were included in the analysis; 9,345 women and 28,585 men
- Compared to men, more women had acquired HIV through intravenous drugs (26.9% vs 12.8%), had prior AIDS (37.3% vs 25.9%), chronic kidney disease (6.0% vs 3.3%) and HIV viral load >200 copies/mL (26.9% vs 17.2%) at baseline

Table. Clinical characteristics of women and men with HIV experiencing a myocardial infarction event by type of ECG changes

Clinical characteristics at MI event		Women with HIV with a MI (%) n=46 (0.5)		Men with HIV with a MI (%) n=288 (1.0)	
		STEMI n=18	NSTEMI, no ECG performed or unknown ECG changes n=28	STEMI n=132	NSTEMI, no ECG performed or unknown ECG changes n=156
Symptoms	Typical symptoms	14 (77.8)	17 (60.7)	116 (87.9)	118 (75.6)
	Atypical symptoms	7 (38.9)	8 (28.6)	19 (14.4)	25 (16.0)
	Other symptoms/no symptoms	0 (0)	1 (3.6)	11 (8.3)	13 (8.3)
Invasive cardiovascular procedure performed within 72h		15 (83.3)	15 (53.6)	118 (89.4)	96 (61.5)
Antihypertensive medication use at MI event or initiation within 31d		15 (83.3)	20 (71.4)	101 (76.5)	123 (78.8)
Antithrombotic medication use at MI event or initiation within 31d		15 (83.3)	22 (78.6)	106 (80.3)	123 (78.8)
Lipid-lowering drug use at MI event or initiation within 31d		17 (94.4)	20 (71.4)	102 (77.3)	120 (76.9)

- 334 individuals had an MI; 0.5% (n=46) of women, 1.0% (n=288) of men
- Median age at MI was similar between sexes (58 vs 57 years)

Clinical presentation at MI (Table)

- Whether ST-elevation MI (STEMI)⁴ or non-ST-elevation MI (NSTEMI)⁵, atypical symptoms were observed in more women than men

MI management (Table)

- Across all types of ECG changes, more women than men presented with atypical symptoms and fewer received an invasive procedure
- Among those with STEMI, more women received secondary prevention medication; among those with NSTEMI/unknown ECG changes, fewer women used antihypertensive or lipid-lowering therapy

Risk factors for MI

- Among those with STEMI, women were more often obese (16.7% vs 11.4%) but less often current smokers (38.9% vs 48.5%)
- Among those with NSTEMI, more women were obese (17.9% vs 5.6%) and current smokers (50.0% vs 40.4%)
- HIV markers were comparable across ECG changes and sex

Limitations

- Analyses were descriptive and did not adjust for potential confounders that may account for differences observed between the sexes

Conclusions

- In this descriptive analysis among people with HIV in a large European/Australian cohort, women more often presented with atypical MI symptoms than men
- Fewer women than men received invasive procedures or guideline-recommended medication for NSTEMI, despite more women than men being smokers and obese
- Further analyses accounting for potential confounders are needed to fully investigate possible sex-based treatment gaps requiring greater awareness in clinical practice

1: Feinstein et al. *Circulation*; 2: Merz et al. *Curr Opin Cardiol* 2018; 3: Neesgaard et al. *Microorganisms* 2020; 4: STEMI: ST elevation and/or left bundle branch block; 5: NSTEMI: persistent or transient ST segment depression, T wave abnormalities, development of Q waves, normal ECG