792

HIV-Associated Heart Failure: Phenotypes and Clinical Outcomes in a Safety-Net Setting

Matthew S. Durstenfeld, Anjali B. Thakkar, Diane Jeon, Robert Short, Yifei Ma, Zian Tseng, and Priscilla Y. Hsue

University of California, San Francisco

Department of Medicine, UCSF; Division of Cardiology, Zuckerberg San Francisco General

BACKGROUND

- Human immunodeficiency virus (HIV) infection is associated with increased risk of heart failure (HF)
- There are conflicting data regarding clinical outcomes (hospitalizations and mortality) among people with HIV and HF compared to people without HIV
- Contemporary HF phenotypes and whether HF outcomes are similar among PWH who receive care within a municipal safety-net system are unknown

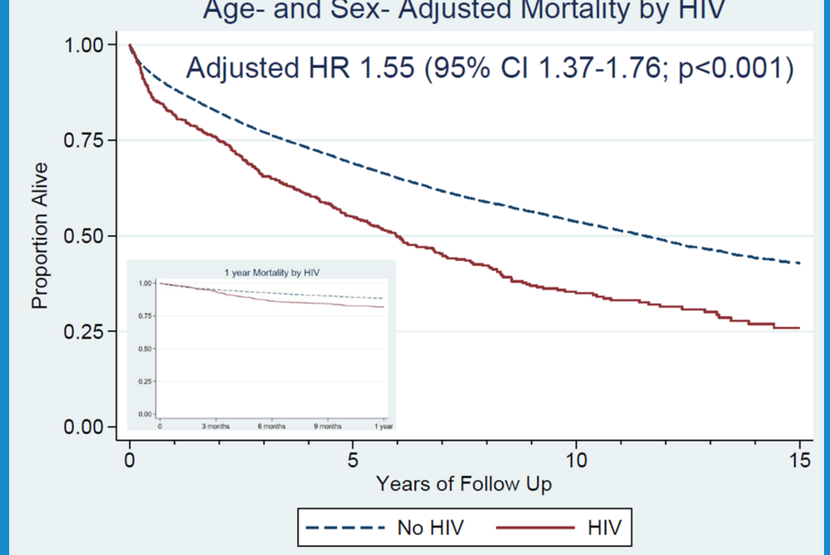
METHODS

- First, we developed an EHR cohort of all individuals with HF by ICD9 or 10 code in San Francisco's municipal health system during 2001-2019 (n=14,829) which we linked to echocardiography and coronary angiography datasets as well as National Death Index Plus data.
- We classified individuals with HIV by ICD-9 or 10 code plus at least one viral load or CD4 count recorded (n=697).
- Among those who died, we assessed cause of death using death certificates (n=3650, 262 PWH) and autopsies (n=81, 14 PWH), many of which were adjudicated through the PoST-SCD Study.
- We used Cox proportional hazards models to estimate the hazard ratio by HIV status adjusted for age, sex, housing, and substance use (primary model) and additionally for past medical history.

Table 1: Participant Characteristics

	HIV (n=697)	No HIV (n=14,132)	p-value
Age, years	52.8 (45.6, 59.1)	62.8 (53.4, 75.1)	<0.001
Female	137 (19.7%)	5718 (40.9%)	<0.001
Race/Ethnicity			<0.001
White	259 (37.2%)	3748 (26.5%)	
Black/African American	310 (44.5%)	3820 (27.0%)	
Asian	23 (3.3%)	3153 (22.3%)	
American Indian/Alaskan Native	10 (1.4%)	148 (1.0%)	
Native Hawaiian/ Pacific Islander	0 (0.0%)	47 (0.3%)	
Hispanic/Latino	81 (11.6%)	2727 (19.3%)	
Other/Decline to state	14 (2.0%)	489 (3.5%)	
Documented Unstable Housing	50 (7.2%)	611 (4.3%)	<0.001
Past Medical History			
Hypertension	503 (72.2%)	11413 (80.8%)	<0.001
Diabetes	43 (6.2%)	1204 (8.5%)	0.029
Myocardial Infarction	84 (12.1%)	2072 (14.7%)	0.056
Chronic Kidney Disease	118 (16.9%)	2085 (14.8%)	0.11
COPD	18 (2.6%)	106 (0.8%)	<0.001
Hepatitis C Virus	370 (53.1%)	1686 (11.9%)	<0.001
Hepatitis B Virus	90 (12.9%)	420 (3.0%)	<0.001
Documented Substance Use			
Alcohol	270 (38.7%)	2897 (20.5%)	<0.001
Tobacco	452 (64.8%)	5651 (40.0%)	<0.001
Opioid	235 (33.7%)	1351 (9.6%)	<0.001
Cocaine	265 (38.0%)	1826 (12.9%)	<0.001
Methamphetamine	285 (40.9%)	1477 (10.5%)	<0.001

HIV associated with 55% higher mortality after Heart Failure diagnosis compared to people without HIV, mainly from non-CVD causes including substance-related



Over median follow-up of 3.5 years, 354 (50.8%) PWH and 5,784 (40.9%) without HIV died (p<0.001). Median survival after HF among PWH was **6.1 years** (95% CI 5.4-7.1 years) versus **11.3 years** (95% CI 10.7-11.7). Findings were similar accounting for past medical history (HR 1.37; 95% CI 1.22-1.54; p<0.001). **Lower CD4 count** (HR 1.69 for CD4 count<200 (95%CI 1.34-2.13; p<0.001), but not **viral load** (HR 1.02; 95%CI 0.80-1.31; p=0.87) or **hepatitis C coinfection** ($p_{interaction}$=0.53), was associated with worse survival.

For more information, email *Matthew.Durstenfeld@ucsf.edu* or on Twitter *@durstenfeld*

Clinical Phenotypes

Echocardiographic Findings	HIV (n=593)	No HIV (n=10579)	p-value
Echo within 30 days of diagnosis	313 (52.8%)	5968 (56.4%)	0.083
HFrEF[a]	225 (37.9%)	3459 (32.7%)	0.008
First EF After HF Diagnosis	45.7 (15.7)	44.4 (15.6)	0.13
Qualitative LV Function			
Hyperdynamic	11 (2.2%)	156 (1.7%)	0.59
Normal	214 (42.7%)	4010 (44.2%)	
Borderline	22 (4.4%)	439 (4.8%)	
Mildly Reduced	47 (9.4%)	842 (9.3%)	
Mild to Moderately Reduced	17 (3.4%)	320 (3.5%)	
Moderately Reduced	50 (10.0%)	779 (8.6%)	
Moderate to Severely Reduced	23 (4.6%)	603 (6.6%)	
Severely Reduced	115 (23.0%)	1879 (20.7%)	
Not reported	2 (0.4%)	46 (0.5%)	
Regional Wall Motion Abnormalities	71 (31.1%)	1023 (34.3%)	0.33
Pulmonary Hypertension			
Severe Pulmonary Hypertension	7 (2.2%)	176 (2.9%)	0.46
PASP, mean (SD)	37.1 (16.8)	36.9 (15.4)	0.85
Valve Disease[b]			
Severe Mitral Regurgitation	33 (10.5%)	406 (6.8%)	0.01
Severe Tricuspid Regurgitation	35 (11.2%)	509 (8.5%)	0.10

- Higher proportion classified as HFrEF (EF < 40%), but no difference in EF or qualitative function.
- Higher proportion with severe mitral regurgitation
- Lower proportion hospitalized for HF (7.7% versus 11.3%, OR 0.51; 95%CI 0.39-0.66; p<0.001)
- More likely to be prescribed HF Medical Therapy: 53% vs 39%; p=0.03
- More likely to have outpatient follow-up within 30 days: 80% vs 65%, p=0.001

Ischemic Cardiomyopathy or Revascularization

Angiography: 150 (22%) PWH and 3,040 (21%) without HIV
No Differences in Angiography Findings: p=0.45
Multivessel Obstructive CAD: 23% vs 26%
Revascularized: 10.2% vs 9.9%
Similar revascularization strategies (bypass vs stents): p=0.66

Non-Cardiovascular Causes of Death Predominant among PWH with HF

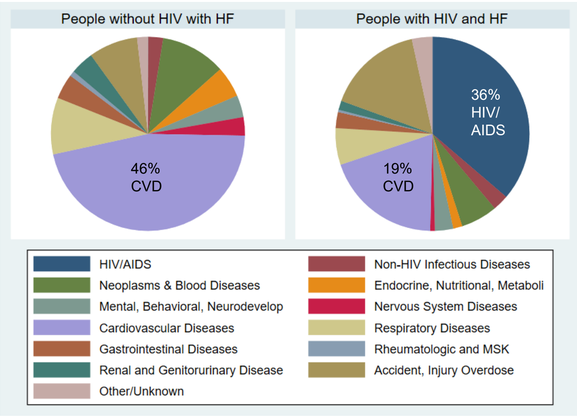


Figure Legend: Primary underlying cause of death as reported on death certificates(n=3650) classified by ICD codes stratified by HIV status. PWH had 2x odds of dying of overdose/ substance use (OR 2.1; 95% CI 1.53-3.00; p<0.001), but not after accounting for documented substance use (OR 0.96; 95% CI 0.67-1.37; p=0.82).

Autopsy Findings (n=81): Fewer PWH met WHO criteria for presumed sudden cardiac death (29% of PWH vs 57% without HIV; p=0.08). Among these presumed SCDs (n=51), PWH had a trend towards fewer adjudicated arrhythmic causes (21.4% vs 41.8%, p=0.23), and more non-cardiac causes (78.6% vs 50.8%; p=0.08), including occult overdose causes of sudden death (64.3% vs 37.8% of noncardiac deaths; p=0.12).

Conclusions

People with HIV are diagnosed with heart failure 10 years earlier than people without HIV. Phenotypes of heart failure are similar Among people with HF who receive care within a municipal safety-net system, HIV infection is associated with higher mortality despite lower odds of HF hospitalization due to non-cardiovascular causes including substance-related and HIV-related mortality.

FUNDING: Dr. Durstenfeld is funded by NIH grant NIH/NLBI (K12 HL143961). This work was assisted in part by a CFAR-ARI Boost Award from the UCSF AIDS Research Institute and supported by the National Center for Advancing Translational Sciences, NIH, through UCSF-CTSI Grant Number UL1TR001872. Dr. Tseng is funded by R01 HL157247 and the autopsy data were funded by R01HL102090. Dr. Hsue is funded by K24AI112393. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.
Disclosures: None of the authors have pertinent disclosures or relevant conflicts of interest.