Repeated Stimulant Use in the Context of Left Ventricular Dysfunction among Women with HIV

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BACKGROUND

- HIV is associated with an increased risk of heart failure (HF), which is especially pronounced in women
- Women with HIV (WWH) use substances at significantly higher rates than women from the general population
- Substance use, especially stimulant use (e.g., cocaine or methamphetamine), has been linked to myocardial infarction and stroke, while long-term stimulant use has been linked to decline in diastolic function. However, tobacco is the only substance included in standard cardiovascular risk assessment tools
- The extent to which specific substances or substance types relate to precursors of clinical HF, such as left ventricular systolic dysfunction (LVSD) or diastolic dysfunction (LVDD), in WWH remains under-studied

METHODS

- Interviews, cardiovascular (CV) risk factors, medical exams, biospecimen collection and echocardiograms were completed between Aug. 2014 and Oct. 2019
- LVSD was defined by American Society of Echocardiography criteria as LV ejection fraction <54% (ASE 2015); LVDD was defined using ASE 2016 criteria
- Repeated use = self-reported use during 2+ visits
- We investigated cross-sectional associations between repeated use of various substances and pre-HF phenotypes, LVSD and LVDD, among women with HIV participating in the Women's Interagency HIV Study
- We used backward elimination logistic regression; explanatory variables were determined with Bayesian information criterion (BIC) to fit parsimonious models for LVSD and LVDD

RESULTS

- N=1,162 women with HIV
- Mean age (SD): 49 years (9)
- Black race: 75%; Hispanic ethnicity: 13%
- Mean systolic blood pressure: 127 mm Hg (20)
- Diabetes: 25%; Prior myocardial infarction: 1%
- Virally suppressed throughout the study period: 55%
- Mean nadir CD4 cell count (SD): 478 (267)

Repeated co-use of stimulants (e.g., cocaine, meth) and tobacco is a potent risk factor for left ventricular dysfunction (LVDD) in women with HIV

Prevalence of Repeated Substance Use

- Tobacco: 45%
- Alcohol: 61%
- Cannabis: 28%
- Stimulant (e.g., cocaine, meth): 11%
- Opioid (e.g., heroin, fentanyl): 3%
- Sedative (e.g., benzodiazepine): 4%
- Stimulant **+** Tobacco co-use: 9%

Prevalence of Study Outcomes

- LVSD: 64 (5.5%)
- LVDD: 71 (6.1%)

Table 1. Associations between Repeated Substance Use and Left Ventricular Systolic Dysfunction (LVSD)

None of the repeated substance use measures were significantly associated with LVSD

Footnotes for Tables 1-3
*95% CI does not include 1
① Study factor considered include: Age, race, ethnicity, menopausal status, highest level of education, study site, body mass index, systolic blood pressure, antihypertensive medication, diabetes, dyslipidemia, estimated glomerular filtration rate (eGFR), Hepatitis C (active or resolved), prior, myocardial infarction, prior stroke, viral suppression throughout the study period, nadir CD4 cell count, antiretroviral therapy
②Parsimonious model includes: age, systolic blood pressure, diabetes, eGFR<60

Table 2. Associations between Repeated Use of Individual Substances and Left Ventricular Diastolic Dysfunction (LVDD)

	Unadjusted OR(95% CI)	Adjusted OR(95% CI) Saturated Model①	Adjusted OR(95% CI) Parsimonious Model②
Tobacco	1.70 (1.05, 2.77)*	1.71 (1.01, 2.91)*	1.86 (1.09, 3.16)*
Alcohol	1.09 (0.66, 1.80)	1.05 (0.61, 1.82)	
Cannabis	1.12 (0.66, 1.89)	0.89 (0.49, 1.62)	
Stimulant	2.11 (1.14, 3.91)*	1.91 (1.18, 3.09)*	1.92 (1.17, 3.16)*
Opioid	0.49 (0.07, 3.63)	0.21 (0.02, 1.75)	
Sedative	2.73 (1.18, 6.32)*	2.12 (0.89, 5.07)	

Table 3. Association between Repeated Co-Use of Stimulants + Tobacco and Left Ventricular Diastolic Dysfunction (LVDD)

	Unadjusted OR(95% CI)	Adjusted OR(95% CI) Parsimonious Model②
Stimulant + Tobacco co-use	1.44 (0.88, 2.37)	2.45 (1.25, 4.80)*

CONCLUSIONS

- Accounting for cardiovascular risk and HIV factors, the odds of LVDD are over twice as high for women with HIV who repeatedly use both stimulants and tobacco
- Models with substance co-use explain the odds of LVDD better than those with a single substance
- No significant association between substance use and LVSD was detected in this cohort
- Assessment of stimulant use alongside standard assessments of tobacco use may improve overall cardiovascular risk assessment in WWH
- Interventions for WWH who use both stimulants and tobacco may lower cardiovascular and particularly HF risk in this population
- Whether evidence-based pharmacotherapies for tobacco use and stimulant use, such as bupropion (Wellbutrin), improve pre-HF phenotypes or cardiovascular risk in this population merit investigation

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WIHS Women's Interagency HIV Study

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