HIV Infection Increases Risk of Acute Exacerbations of COPD

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BACKGROUND

- Chronic obstructive pulmonary disease (COPD) is characterized by progressive decline in lung function punctuated with acute worsening of respiratory symptoms, termed acute exacerbation of COPD (AECOPD)
- Injection drug users (IDUs) frequently report respiratory symptoms, yet obstructive lung disease is under-recognized in this population
- HIV infection which is prevalent in IDUs, has been shown to increase risk of COPD and lung function decline
- AECOPD, a major contributor to morbidity and mortality, is understudied in HIV populations
- The AIDS Linked to the IntraVenous Experience (ALIVE) study is an on-going prospective, community-based cohort that collects data from current and former IDUs including behavioral, clinical and spirometric measurements twice each year

OBJECTIVE

- To determine the factors associated with AECOPD among people with and at risk for HIV infection

METHODOLOGY

Participant Selection:
- AIDS Linked to the IntraVenous Experience (ALIVE cohort): ≥18 years old, inner city Baltimore, history of injecting drugs
- Spirometry and vitamin D measurements within 1 year
- Demographic and clinical data selected from visit immediately prior to date of spirometry
- Seen every 6 months for assessment

AECOPD Ascertainment:
- Assessed at each 6 month study visit
- Answering "yes" to: "In the last 6 months, have you had a worsening of your breathing status requiring treatment with antibiotics or steroids?"

Spirometry Measurement:
- Pre-bronchodilator spirometry, KOKO® pneumotachometers
- COPD defined as pre-bronchodilator FEV1/FVC ratio < 0.70 on all spirometry measures performed during study period

Statistical Methods:
- Multivariable logistic regression with generalized estimating equations
- COPD literature and univariable analysis informed covariate selection

SOCIODEMOGRAPHIC & CLINICAL CHARACTERISTICS

N	167
Age, years, mean(SD)	52.4 (8.1)
Female, n(%)	50 (30)
Black race, n(%)	148 (89)
BMI, kg/m^2, median(IQR)	24.2 (21.4-27.1)
Smoking Status, n(%)	
Current	151 (90)
Former	13 (8)
Never	3 (2)
Smoking, pack-year, median(IQR)	24 (15-38)
FEV1, mean(SD)	
Absolute, L	2.29 (0.84)
% Predicted	74.0 (21)
FVC, mean(SD)	
Absolute, L	3.74 (1.2)
% Predicted	96.5 (20)
FEV1/FVC, Absolute, L, mean(SD)	0.61 (0.9)
Severity of Airflow Obstruction, n(%)	
Mild (FEV1≥80% predicted)	68 (41)
Moderate(FEV1 50-70% predicted)	79 (47)
Severe (FEV1 <50% predicted)	20 (12)
Current IDU, n(%)*	60 (36)
Comorbid Disease*†, n(%)	82 (49)
Hepatitis C antibody seropositive*, n(%)	142 (85)
Undetectable HCV RNA	23 (17)
HCV RNA level, 1000copies/mL‡, median(IQR)	1830 (735-5010)
HIV-infected, n(%)	53 (32)
CD_4 count, cells/mm^3, median(IQR)	312 (193-454)
HIV-1 RNA level, copies/mL§, median(IQR)	4858.5 (1184-34350)
Undetectable viral load, n(%)	28 (54)
HAART use*, n(%)	38 (72)

* In previous 6 months
† Self-reported treatment for diabetes, hypertension, hyperlipidemia, heart disease, renal disease, seizure disorder, stroke or cancer.
‡ Among HCV seropositive participants with detectable HCV RNA.
§ Among HIV-infected participants with detectable HIV RNA.
Abbreviations: CI, Confidence Interval; FEV1, Forced Expiratory Volume in 1 second; FVC, forced vital capacity; IQR, interquartile range; SD, standard deviation

INTIAL FINDINGS

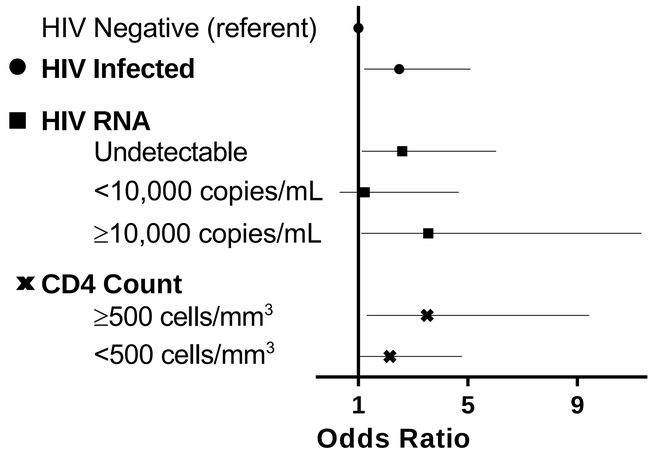
- 167 participants
- 552 ALIVE study visits
- Median 3 visits over 1.5 years
- 53 AECOPD events in 36 individuals
  - 24 participants had 1 AECOPD
  - 9 participants had 2 AECOPD
  - 1 participant had 3 AECOPD
  - 2 participants had 4 AECOPD

CHARACTERISTICS ASSOCIATED WITH AECOPD

Covariate	Adjusted OR (95% CI)	p-value
Female	2.67 (1.32, 5.41)	0.006
HIV Infection	2.49 (1.21, 5.10)	0.013
Comorbid Disease*†	2.32 (1.17, 4.63)	0.016
Airflow Obstruction		
Mild (FEV1 ≥ 80% predicted)*	Reference	
Moderate (FEV1 50-79% predicted)*	2.63 (1.13, 6.14)	0.025
Severe (FEV1 < 50% predicted)*	5.86 (2.16, 15.85)	0.001

Odds Ratios mutually adjusted for other covariates in the table.

MULTIVARIABLE MODELS OF AECOPD



3 models presented, all with HIV Negative referent
(adjusted for gender, comorbid disease and COPD severity)

Inclusion of prior AECOPD into our models attenuated HIV effect

CONCLUSIONS

- HIV is an independent risk factor for AECOPD
- Prior AECOPD strongly influences the risk for future AECOPD
- Healthcare providers should consider a diagnosis of AECOPD in a patient with HIV infection or with frequent respiratory symptoms as this diagnosis is likely under-recognized

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Questions / Comments: Please email alamber5@jhmi.edu