12-MONTH CONSEQUENCES IN PEOPLE WITH HIV/SARS-CoV-2 COINFECTION: NATIONAL EHR COHORT

Yuanzhen Yue[1], Chen Liang[1], Sharon Weissman[1], Tianchu Lyu[1], Bankole Olatosi[1], Xiaoming Li[1], on behalf of National COVID Cohort Collaborative Consortium
[1] University of South Carolina, Columbia, SC, USA

National COVID Cohort Collaborative

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BACKGROUND

- Long-term consequences of COVID-19 (aka, Long Covid) are very well characterized in general populations.
- Yet, it remains unclear how SARS-CoV-2 infection would attribute to the risks of long-term consequences in people with existing HIV infection.
- This study aims to examine the long-term consequences of COVID-19 for people living with HIV (PLWH) at 12 months after the first SARS-CoV-2 infection using nation-wide Electronic Health Records (EHR).

METHODS

- Retrospective cohort study
- Data: EHR from the National COVID Cohort Collaborative (N3C)
  - Sampled from 50 states and over 75 healthcare systems in the US
- Cohort construction:
  - Cases: PLWH with COVID-19 between March 1, 2020 and January 15, 2021
  - Historical control: PLWH without COVID-19 between March 1, 2018 and January 15, 2019 (two years predating the pandemic)
  - Contemporary control: PLWH without COVID-19 between March 1, 2020 and January 15, 2021 (to mitigate time/selection biases)
  - The time of HIV infection was before March 1, 2020 for the cases and contemporary control and, before March 1, 2018 for historical control
  - The date of the first COVID-19 infection marked the start of a 12-month follow-up in the COVID-19 group
- Statistical design:
  - Multiple logistic regression
  - Outcomes: Health consequences (Pulmonary, Cardiovascular, Cerebrovascular, Renal, Liver, Neuropsychological) at 12 months post COVID-19 (Table 1)
  - Exposure: SARS-CoV-2 infection
  - Covariates: Sex, Age, Race/ethnicity, Smoking, Obesity & BMI, Diabetes, Hypertension

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Principal Findings

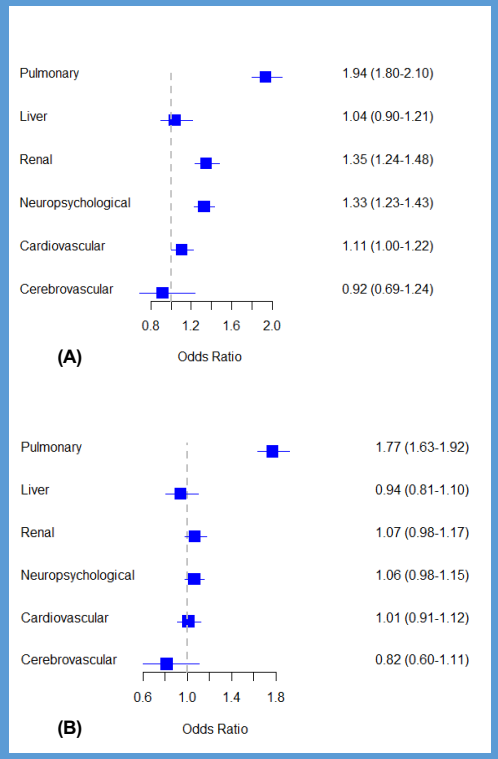


Figure 1. Risks of long-term consequences of COVID-19 at 12 months among people living with HIV compared with the contemporary control (A) and historical control (B). Confidence interval is 95%.

PRINCIPAL FINDINGS

- We identified 5,619, 41,791, and 24,239 patients for COVID-19 cases, contemporary control, and historical control, respectively.
- This sentinel study for the first time reported elevated risks of multi-system dysfunction among PLWH at 12 months post acute phase of COVID-19. (Figure 1)
- It is so far the largest EHR cohort study assessing long-term consequences of COVID-19 in PLWH.
- Our findings call for immediate attention to the post-COVID care among PLWH, including follow-up guidelines, care planning, and health policy tailored for PLWH.

Table 1. Health consequences across multi-organ systems.

Composite clinical consequences	Individual clinical consequences
Pulmonary Complications	• Acute respiratory distress syndrome (ARDS) • Chronic pulmonary thromboembolic disease • Chronic thromboembolic pulmonary hypertension (CTEPH) • Dyspnea (including shortness of breath) • Pulmonary embolism • Pulmonary fibrosis (including scarring) • Pulmonary Hypertension
Cardiovascular complications	• Cardiac arrest • Cardiogenic shock • Cardiomyopathy • Dysrhythmia (atrial fibrillation, sinus tachycardia, sinus bradycardia, ventricular arrhythmias, atrial flutter) • Heart failure (congestive heart failure) • Ischemic heart diseases (acute coronary disease, myocardial infraction, ischemic cardiomyopathy, angina) • Myocarditis • Thrombotic diseases (pulmonary embolism, deep vein thrombosis, superficial vein thrombosis)
Cerebrovascular complications	• Cerebral Aneurysms (rupture) • Cerebral vascular event and sequelae • Stroke (hemorrhagic) • Stroke (ischemic) • Transient ischemic attack
Renal complications	• Acute kidney disease (AKD) • Acute on chronic renal failure (ACRF) • Chronic kidney disease (CKD) • Glomerulonephritis • Infection-associated acute kidney injury (infection AKI) • Interstitial nephritis • Proteinuria
Liver complications	• Abnormal Liver tests • Hepatic coma • Metabolic-associated fatty liver disease (NAFLD) [aka, Nonalcoholic fatty liver disease (NAFLD)] • Non-viral hepatitis
Neuropsychological complications	• Cognitive and memory disorders (dementia, memory loss, Alzheimer's) • Delirium • Dementia • Encephalitis • Fatigue • Mental disorders (major depression, stress, anxiety, psychotic disorders) • Neuropathic pain • Neuropathy • Sensory disorders (anosmia) • Sensory disorders (dysgeusia or ageusia) • Sensory disorders (hearing, tinnitus) • Sensory disorders (vision)

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NIH National Institute of Allergy and Infectious Diseases

CONTACT INFORMATION

Chen Liang, PhD
Assistant Professor, University of South Carolina
Email: cliang@mailbox.sc.edu