


Long COVID and HIV

Annie Antar, MD PhD
Assistant Professor
The Johns Hopkins University School of Medicine
Baltimore, Maryland



IAS-USA
International AIDS Society USA

1

Financial Relationships With Ineligible Companies (Formerly Described as Commercial Interests by the ACCME) Within the Last 2 Years

Dr Antar has no relevant financial relationships with ineligible companies to disclose. (Updated May 31, 2023)

Slide 2

2

Learning Objectives

After attending this presentation, learners will be able to:

- Identify HIV as a risk factor for long COVID in the USA
- Describe emerging data on neurocognitive outcomes post-COVID in people with HIV

Slide 3

3

HIV is a risk factor for severe acute COVID-19

- Elevated risk of death during acute COVID-19
 - USA/N3C: aOR **1.29**
 - Global/WHO: aHR **1.30**
- Elevated risk of hospitalization during acute COVID-19
 - USA/N3C: aOR **1.20**
- These analyses were adjusted for age, sex, and comorbidities

WHO, July 2021. <https://www.who.int/publications/item/WHO-2019-nCoV-Clinical-HIV-2021.1>
 N3C: Yang, X, et al. Lancet HIV, November 2021. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8514200/>

Slide 5

5

Factors that increase risk for poor outcomes during acute COVID-19 in PWH

- Classical COVID-19 risk factors:
 - Age, diabetes, obesity, kidney disease, COPD, hypertension, male sex, race, ethnicity
- CD4 < 200-350
- CD4 nadir < 200
- In some analyses, unsuppressed HIV viral load

WHO, July 2021. <https://www.who.int/publications/item/WHO-2019-nCoV-Clinical-HIV-2021.1>
 N3C: Yang, X, et al. Lancet HIV, November 2021. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8514200/>
 CNCS: Shapiro, A, et al. AIDS, April 2022. https://journals.lww.com/aids/journalpages/abstract/2022/04000/factors_associated_with_severity_of_COVID_19.aspx
 COVID-19 Real-Time Learning Network, HIV topic. <https://www.lidsociety.org/covid-19-real-time-learning-network/special-populations/?v=1>

Slide 6

6

What about long COVID in PWH?

Peluso & Antic. 2023. Curr Opin HIV AIDS. https://journals.lww.com/cohiv/articles/2023/05000/Long_COVID_in_people_living_with_HIV.4.aspx

Slide 7

7

EMR study: Increased risk of multi-organ dysfunction in PWH 12 months post-COVID

- NC3 study, USA
- ~5,600 PWH with COVID-19 before Jan 2021 compared to ~41,700 PWH without COVID-19
- Followed up at 12 months

System	Odds Ratio (95% CI)
Pulmonary	1.94 (1.80-2.15)
Liver	1.04 (0.90-1.21)
Renal	1.35 (1.24-1.48)
Neuropsychological	1.33 (1.23-1.43)
Cardiovascular	1.11 (1.00-1.22)
Cerebrovascular	0.52 (0.69-1.24)

Yue, Y, Liang, C, et al. CROI 2023 Poster #884

9



LIINC cohort findings

Outcome	Long COVID	OR (95% CI)
Obesity	10,100 (10.1%)	1.10 (1.05-1.15)
Long COVID > 5 symptoms	1,100 (1.1%)	1.10 (1.05-1.15)
Long COVID > 5 symptoms (adjusted)	1,100 (1.1%)	1.10 (1.05-1.15)

- San Francisco post-COVID cohort. 280 participants. 54 are PWH. Median age 44. 53% male sex at birth. 60% with obesity. >70% with long COVID.
- At ~4 months post-COVID, HIV was not significantly associated with long COVID (> 5 symptoms), long COVID > 5 symptoms, fatigue, or cardiopulmonary symptoms after adjustment

Peluso, M, et al. 2022 AIDS. DOI: 10.1097/QAD.0000000000003338
 Peluso, M et al. 2022 JCI. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC888330/>

10



EMR study: Increased risk of long COVID in PWH compared to HIV-negative people

Outcomes	HIV +	PASC risk	HIV -	OR (CI)
Mortality	597 (2%)	31411 (1%)	2-01 (1.85, 2.18)	
Diabetes	598 (3%)	33668 (1%)	2-61 (2.40, 2.83)	
Heart Disease	763 (5%)	55872 (2%)	2-44 (2.27, 2.62)	
Malignancy	517 (3%)	29644 (1%)	3-15 (2.89, 3.45)	
Thrombosis	699 (3%)	32612 (1%)	3-04 (2.82, 3.28)	
Mental Disorders	681 (8%)	72369 (3%)	2-79 (2.58, 3.02)	

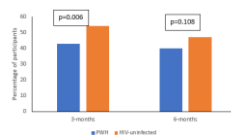
- Electronic medical record study – TriNetX, USA. Data through Sept 2022.
- ~28,000 PWH compared to ~28,000 propensity-matched HIV-negative people
- PWH were also more likely to complain of 6 symptoms including fatigue, cognitive impairment, and body aches in the post-acute period than people without HIV.
- Vaccination prior to infection potentiates these post-acute outcomes in PWH.

Yendewa, G, et al. Under review at the Lancet HIV. Preprint: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4276603
 Yendewa, G, et al. CROI 2023 Poster #724

11



HIV not a risk factor for long COVID in one South African survey study



- Large survey study in South Africa of hospitalized and non-hospitalized people with confirmed COVID-19.
- ~3,700 participants surveyed. 151 PWH. Participants got COVID-19 during the beta, delta, or omicron waves.
- PWH were less likely to report persistent symptoms 3 months post-COVID, with no difference at 6 months.

Jassat, W et al. 2023. *Int. J. Infect. Dis.* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC800015/> Slide 12

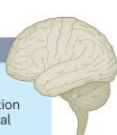
12

Neurocognitive long COVID

Neurological system

- Cognitive impairment
- Fatigue
- Disordered sleep
- Memory loss
- Tinnitus

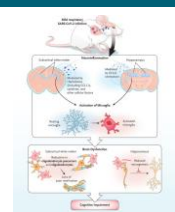
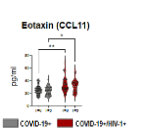
- Dysautonomia
- ME/CFS
- Neuroinflammation
- Reduced cerebral blood flow
- Small fibre neuropathy



Davis, H, et al. 2023. *Nat Rev Microbiol.* DOI: [10.1038/s41572-023-00898-4](https://doi.org/10.1038/s41572-023-00898-4) Slide 14

14

Neurocognitive long COVID

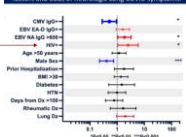



Verhastaramani & Weiler. 2022. *NEJM.* DOI: [10.1056/NEJMciv2210688](https://doi.org/10.1056/NEJMciv2210688)
 Fernandez-Castaneda, A, et al. 2022. *Cell.* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8189143/>
 Adesse, D, et al. CROI 2023 Poster #496 Slide 15

15

LIINC cohort: HIV, CMV, and EBV reactivation are associated with neurocognitive long COVID

Figure 3. Associations between demographic and clinical factors and odds of neurocognitive long COVID symptoms.



- San Francisco-based post-COVID cohort.
- 327 participants. 63 are PWH. Median age 44. 53% male sex at birth. 60% with obesity. >70% with long COVID.

Peluso, M et al. 2022. JCI. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC882830/>
Peluso, M et al. CROI 2023 Poster #273

Slide 16

16

Cognition and mood remain largely stable in a young, healthy, vaccinated cohort of early-treated PWH

Table 3. Virologic, mood, and cognitive outcomes before and after COVID-19.

Parameters	Before COVID-19	After COVID-19*	p-value
1 st post-COVID measure	7 (2.4%)	11 (3.9%)	0.231
Age-adjusted OR (95% CI)		1.68 (0.73 – 3.83)	
All available post-COVID	7 (2.4%)	20 (8.8%)	
Age-adjusted OR (95% CI)		1.48 (0.65 – 3.36)	
NPZ-4 score	0.92 (0.85-0.99)	0.87 (0.78-0.96)	0.161
2-Color Trails 1	1.32 (1.24-1.41)	1.32 (1.23-1.42)	0.962
2-Color Trails 2	0.97 (0.88-1.06)	1.01 (0.92-1.11)	0.283
2-Strained Pictogram	0.81 (0.47-0.74)	0.49 (0.34-0.64)	0.075
2-Trail Making A	0.77 (0.60-0.97)	0.64 (0.44-0.83)	0.125
PHQ-8	5.30 (4.90-5.13)	5.30 (4.78-6.13)	0.387
Depress Thermometer	2.79 (2.51-3.06)	2.90 (2.59-3.23)	0.462

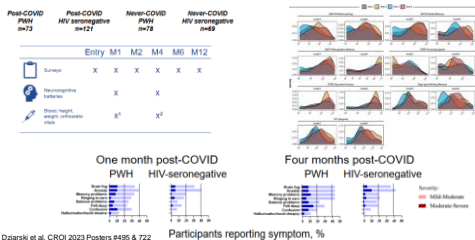
- RV254/SEARCH010 substudy of Thai people with ART initiation during acute HIV infection.
- Confirmed COVID-19 between April 2021 and September 2022. 82% Omicron. 81% full vaccination before COVID-19.
- >97% male sex. Median age 32. Low rate of comorbidities.
- Cognitive and mood assessments before and after COVID-19 in ~218 PWH largely remain stable with non-significant trends.
- More neuropsychological studies to follow in this cohort – imaging, CSF, etc.

Ocampo, F. et al. CROI 2023 Poster #494

Slide 17

17

amfAR HIV-long COVID cohort: Post-COVID neurocognitive changes in PWH are attributable to HIV more so than COVID



Antar et al. Dzalski et al. CROI 2023 Posters #495 & 722

Slide 18

18

Summary

- HIV is a risk factor for long COVID in the USA.
- Global data are still emerging.
- Data are conflicting over whether PWH are more likely to experience neurocognitive long COVID.
- Larger studies with HIV-negative and COVID-negative controls are needed to define the role of HIV infection in post-acute COVID outcomes.

Slide 20

20

Q and A Session

IAS-USA

21
