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BACKGROUND

- A variety of infections and inflammatory conditions have been associated with false positive (FP) serological tests, including those for HIV.
- In the context of an HIV counseling, testing, and referral program, an apparent increase in FP 4th generation HIV tests was observed among persons infected with SARS-CoV-2.
- We sought to determine if there was an association of active coronavirus disease-2019 (COVID-19) with a FP HIV test.

METHODS

- This is a retrospective, cross-sectional study from March 2020 to August 2021 at Henry Ford Hospital.
- Through electronic medical record extraction, all those PCR tested for SARS-CoV-2 result within \pm two weeks of a diagnostic HIV 4th generation assay (Elecsys HIV Duo, Roche) were selected.
- Confirmatory HIV-1 and 2 antibodies, as well as quantitative HIV RNA was performed for all positive 4th generation tests.
- All positive HIV 4th generation assays were independently reviewed and divided into groups of FP, true positives (TP), and true negatives (TN).
- Variables included age, race, ethnicity, and gender.
- Statistical analysis was performed in a pairwise fashion using a Chi-square test.
- Multivariate logistic regression was used to predict positive COVID-19 tests.

Acute COVID-19 disease should be considered as a potential etiology for a false positive 4th generation HIV test

RESULTS

Table 1. Chi-squared test of COVID positive tests in groups of HIV 4th generation true positives, false positives, and true negatives

| | | HIV 4 th generation Test (n=23,278, %) | | | Overall p-value |
|------------------------|----------|--|----------------|---------------|-----------------|
| | | True Positive | False Positive | True Negative | |
| SARS-CoV-2 PCR Test | Positive | 12 (7.2) | 16 (22.9) | 2354 (10.2) | 0.005 |
| | Negative | 155 (92.8) | 54 (77.1) | 20687 (89.7) | |
| | Total | 167 | 70 | 23041 | |

[HIV: human immunodeficiency virus; SARS-CoV-2: severe acute respiratory distress coronavirus-2; PCR: polymerase chain reaction]
 *HIV-1 viral loads were not done on all non-reactive HVI 4th generation tests

RESULTS

- A total of 23,278 charts were reviewed.
- The rates of COVID positive tests were then arranged in groups of HIV TP, FP, and TN. In total, 23,041 patients had a TN HIV test, 167 patients had a TP, and 70 patients had a FP (Table 1).
- Those with HIV FP tests had the highest percentage of COVID positive test results at 22.9% (p=0.001), which was significantly higher than HIV TN (10.2%; p=0.197) and HIV TP (7.2%; p=0.001).
- After adjustment for all covariates, only FP HIV was significantly associated with COVID-19 (OR=7.04; p=0.001).

CONCLUSIONS

- This study reveals that patients with active COVID-19 disease are significantly more likely to have a FP 4th generation HIV test.
- The mechanism for this is unknown but may reflect broad polyclonal antibody activation in acute infections or cross-reactivity with the spike protein.
- Although only a single 4th generation test was evaluated in this study, acute COVID-19 infection should be considered as a potential etiology for a false positive 4th generation HIV test.

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