IMPACT OF EARLY ART INITIATION ON PERFORMANCE OF HIV CROSS SECTIONAL INCIDENCE ASSAYS

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Background

- RV217 study is an early capture cohort designed to examine the progression of HIV from the early stages of infection.
- Individuals considered to be high risk for contracting HIV were eligible to enroll.
- Participants were screened regularly prior to and after their first positive test.
- We used longitudinal samples from the RV217 Cohort with ART initiation at different time points and evaluated the impact it had on OD-n (LAg-Avidity) and Avidity Index (BioRad-Avidity).
- Previous studies have shown that ART can impact HIV cross-sectional incidence assays, giving a false positive for recent infection.
- We sought to assess the performance of the LAg-Avidity and BioRad-Avidity assays among individuals who initiated ART at varying lengths after infection.

Methods

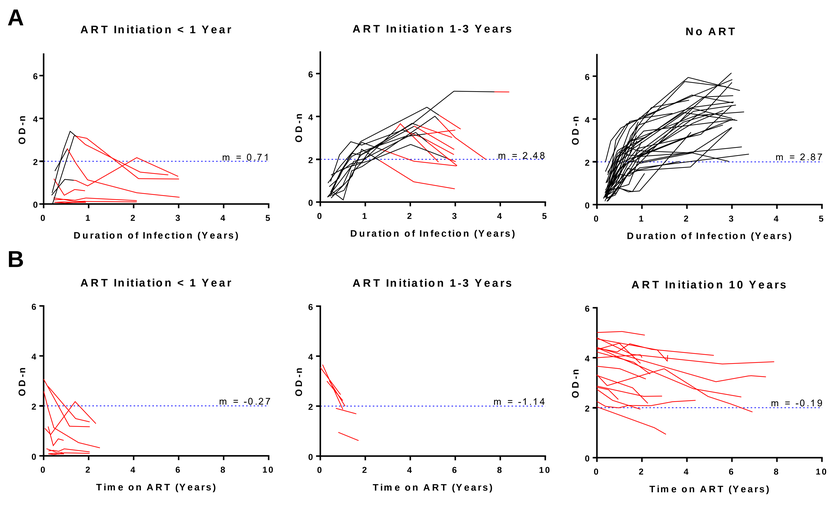
- We tested 302 samples that had been collected from 55 individuals. Participants were from Thailand, Kenya, or Uganda.
- Each participant contributed 4-7 samples (Average: 5.5) and samples were collected 0.15 to 4.20 years post infection.
- Participants were divided into three groups: individuals who never received ART (N=34); individuals who received ART <1 year after infection (N=9); and individuals who received ART1-3 years after infection (N=12).
- We assessed the OD-n and Avidity Index (AI) slope values in the first year post-infection among the three groups from the RV217 Cohort.
- We assessed the slope after ART initiation among the two RV217 groups that received ART.
- Data was compared to previously published data from the Johns Hopkins HIV Cohort, which included participants who did not initiate ART until an average of 10 years after infection.
- Analyzed data to test for differences in assay performance across country, age, and gender. Demographic comparisons were limited to participants not on ART.
- Analysis utilized a mixed-effects random slope, random intercept model in STATA 14.

Table 1: Participant Demographics

Country	Thailand	Kenya	Uganda	Total
# of Participants	31 (56%)	19 (35%)	5 (9%)	55
Median Age (IQR)	23 (18-25)	24 (22-24)	26 (25-26)	23 (20-26)
Cisgender Male	19 (100%)	0	0	19
Cisgender Female	2 (8%)	19 (73%)	5 (19%)	26
Transgender Female	10 (100%)	0	0	10
No ART	19 (56%)	11 (32%)	4 (12%)	34
ART <1 Year	3 (33%)	6 (67%)	0	9
ART 1-3 Years	9 (75%)	2 (17%)	1 (8%)	12

Results

Figure.1 LAg-Avidity



Legend: Individual not on ART; Individual on ART; Cutoff for recent/long term infection; m = slope

Figure.1A: LAg-Avidity - RV217 results by duration of infection

- ART initiation <1 year after infection resulted in a OD-n slope -2.15 units lower than in participants who did not initiate ART (95% CI -2.96, -1.33)
- Prior to ART initiation there was no difference in OD-n slope between the group who did not receive ART and the group who received ART 1-3 years after infection (p=0.31)

Figure.1B: LAg-Avidity - RV217 & Johns Hopkins HIV Cohort results by time on ART

- When ART was initiated 1-3 years after infection the OD-n decreased at a slope 0.74 units/year steeper than when it was initiated <1 year after infection (95% CI 0.28, 1.20)
- ART initiated 1-3 years after infection resulted in an OD-n decrease 0.90 units/year quicker than when ART was initiated 10 years after infection (95% CI 0.47, 1.32)

Figure.2 BioRad-Avidity

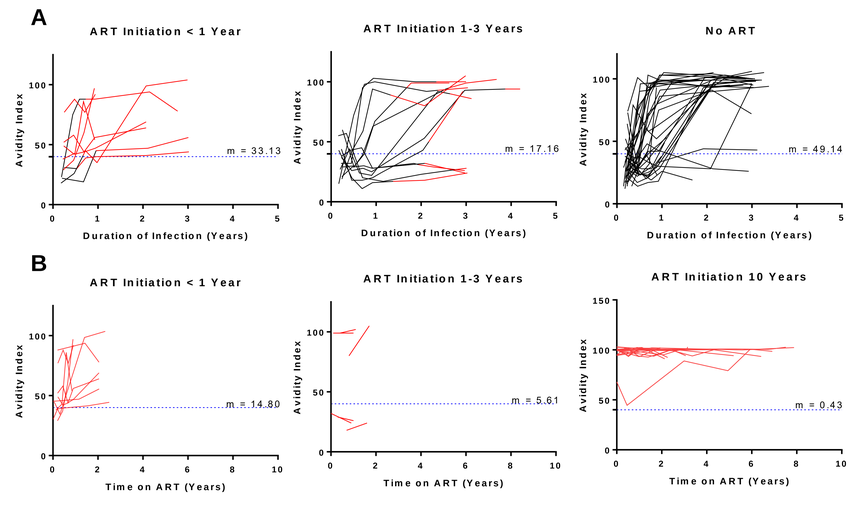


Figure.2A: BioRad-Avidity - RV217 results by duration of infection

- ART initiation <1 year after infection did not result in a significant difference in AI slope (p=0.41)
- In the first year post-infection there was not a significant difference in AI slope between those who did not receive ART and those who initiated ART 1-3 years after infection (p=0.08)

Figure.2B: BioRad-Avidity - RV217 and Johns Hopkins HIV Cohort results by time on ART

- We found no significant difference in AI slope after ART initiation between participants who initiated ART <1 year after infection and 1-3 years after infection (p=0.25)
- ART initiation 10 years after infection did not result in a significantly different AI slope than when ART was initiated 1-3 years after infection (p=0.66)

Conclusions

- ART had a more significant impact on the LAg-Avidity assay when ART is initiated earlier in infection. This could lead to the overestimation of HIV incidence in populations where ART use is prevalent or unknown
- ART did not have an impact on the Johns-Hopkins modified BioRad-Avidity assay. Use of this assay with this procedure could yield more accurate HIV incidence estimates in populations with where ART use is unknown
- Statistical significance was not achieved in comparing HIV cross-sectional assay results between: country; gender; or age at study enrollment. Despite this, we observed 9/31 (29%) individuals from Thailand who had a persistently low AI. Future research should seek to explain this phenomenon

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