Impact of rapid initiation of antiretroviral therapy on retention in care in the Southern United States

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INTRODUCTION

Since 2012, the Department of Health & Human Services HIV guidelines have endorsed antiretroviral therapy (ART) for every person living with HIV.[1] Additionally, data in more recent years has supported rapid initiation of ART, which the World Health Organization defines as starting treatment within 7 days of HIV diagnosis.[2]

The potential benefits of rapid ART have been discussed in the literature, including decreased time to viral suppression.[3,4] The hope is that achieving a suppressed viral load more quickly will ultimately reduce transmission. However, it is also known that 80% of new HIV infections are transmitted from individuals who either do not know they are HIV-infected or who know of their HIV diagnosis but who are not in care.[5] Therefore, retention in care is crucial for ending the HIV epidemic.

International studies in low- and middle-income countries have demonstrated that rapid ART can potentially increase retention in care. Colasanti and colleagues studied the effects of rapid ART initiation in the Southern United States, where there is a heavy burden of undiagnosed HIV and vulnerable populations, such as ethnic minorities and women.[4,5] However, their study did not examine the effect on retention in care.

The goal of this study is to determine if rapid initiation of ART will improve retention in care and clinical outcomes among an HIV population in the Southern US. Secondary endpoints were measures of clinical outcomes, including CD4 count and rates of viral suppression.

METHODS

Study design and population

This was a prospective study including newly diagnosed HIV patients, 18 years and older establishing care at the 550 Clinic between July 1, 2021, and August 31, 2022. After consenting and initiating ART, patients were followed up after 4-8 weeks (visit 2), then after 12-16 weeks (visit 3), and subsequently every 4-6 months thereafter (visits 4 and beyond).

Data collection and Outcome definitions

Patients were categorized into two arms: rapid and non-rapid arm. The rapid ART arm included patients who started ART within 7 business days of HIV diagnosis, whereas the non-rapid arm included patients who started ART per standard of care beyond that timeframe. Visit data collected including demographics, past medical history, laboratory findings including viral count and CD4 count, and appointment attendance.

Primary outcome: Retention in HIV care at 1 year (defined as meeting the following criteria):
1. Keeping at least 3 visits within the first 12 months of care
2. Attending a clinic visit between months 9-12 of care
3. Experiencing no gaps in care greater than 6 months

Secondary outcomes:
1. Rates of viral suppression (viral load < 200 copies/mL)
2. CD4 count

Statistical Analysis

Descriptive statistics were performed to compare the epidemiological and clinical characteristics, as well as time to visit data for the rapid and non-rapid arm. Baseline categorical explanatory variables were summarized as frequencies and percentages and differences between both groups of patients were analyzed using a chi-square test or Fisher's exact test when appropriate and warranted. Continuous variables were summarized as frequencies and interquartile range and differences between groups were analyzed by Wilcox-Mann-Whitney test. A P-value <0.05 was considered statistically significant. All data were analyzed in RStudio (R Foundation for Statistical Computing, Vienna, Austria)

RESULTS

- A total of 107 HIV-positive patients were enrolled (65 participants into the rapid arm, and 42 participants into the non-rapid arm).
- By partnering with local testing organizations in the community and implementing a warm hand-off approach, patients enrolled in the rapid-start arm initiated ART within a median of 2 days after diagnosis vs 58 days for the non-rapid arm.
- Retention was significantly higher in the rapid arm at visit 4 (56.3% vs 8.7%; p=0.003) compared to the non-rapid arm.
- CD4 count was significantly different between the rapid and non-rapid arms at each visit.
- At visit 2, the non-rapid arm had a higher percentage of participants who achieved a suppressed and an undetectable viral load. By visits 3 & 4, however, the rapid arm had higher rates of these same endpoints. Of the 5 total participants who have been enrolled long enough to achieve a 5th clinic visit, 100% had an undetectable viral load.
- Of participants enrolled long enough for a 4th visit, data show a significantly higher rate of retention among the rapid arm than among the non-rapid arm.
- Further analyses showed no significant factors for retention in care between the rapid and non-rapid arm.

Table 1: Characteristics of the population enrolled as of August 31, 2022 (N=107)

	Prospective RAPID (BIC/F/TAF started within 7 days of diagnosis)	Prospective non-RAPID (BIC/F/TAF started in >7 days of diagnosis)	P-value
N	65	42	
Demographics			
Age (median [IQR]), years	28 [24, 36]	35 [28, 48]	0.005
Female sex at birth (%)	9 (13.8)	9 (21.4)	0.448
Race (%)			0.024
White	28 (43.8)	27 (64.3)	
African American	24 (37.5)	13 (31.0)	
American Indian or Alaskan Native	0 (0.0)	1 (2.4)	
Other/Mixed	12 (18.8)	1 (2.4)	
Hispanic (%)	11 (17.7)	2 (4.8)	0.097
Health insurance (%)	37 (57.8)	30 (71.4)	0.224
Stable housing (%)	54 (83.1)	33 (78.6)	0.742
Patient provided transportation	54 (83.1)	38 (90.5)	0.429
Past medical history			
History of Hepatitis C (%)	6 (9.2)	10 (25.0)	0.057
Outcome of Hepatitis C (%)			0.53
Self-cleared	0 (0.0)	0 (0.0)	
Treated	2 (50.0)	2 (22.2)	
Treatment - naïve	2 (50.0)	7 (77.8)	
History of Hepatitis B (%)	1 (1.5)	3 (7.5)	0.305
Social history			
Any alcohol use (%)	28 (43.1)	16 (42.1)	1
Tobacco use (%)			0.008
Never smoker	37 (57.8)	10 (26.3)	
Current smoker	21 (32.8)	23 (60.5)	
Previous smoker	6 (9.4)	5 (13.2)	
Illicit drugs use (%)			0.631
Never	32 (49.2)	15 (39.5)	
Current use	23 (35.4)	16 (42.1)	
Previous use	10 (15.4)	7 (18.4)	
Risk factors for HIV transmission			
IV Drug use (%)	13 (20.3)	13 (34.2)	0.186
Heterosexual (%)	18 (28.1)	16 (43.2)	0.183
Bisexual (%)	4 (6.2)	4 (10.8)	0.663
MSM (%)	41 (64.1)	15 (39.5)	0.027

Table 2. Visit and laboratory data collected at the baseline and first office visits. (N=107)

	Prospective RAPID (BIC/F/TAF started within 7 days of diagnosis)	Prospective non-RAPID (BIC/F/TAF started in >7 days of diagnosis)	P-Value
N	65	42	
Time to ART initiation from HIV diagnosis, days (median [IQR])	3 [1, 7]	49 [26, 148]	<0.001
Visit one			
CD4 Count (median [IQR])	351 [183, 514]	476 [336, 716]	0.003
Viral load (median [IQR])	50150 [15200, 268000]	47900 [9030, 398250]	0.954
Antiretroviral therapies (%)			
Bictegravir/emtricitabine/tenofovir alafenamide	65 (100.0)	35 (83.3)	0.003
Dolutegravir/lamivudine	0 (0.0)	1 (2.4)	0.825
OI prophylaxis (%)	12 (18.5)	8 (21.1)	0.95
Type of OI prophylaxis			0.494
Sulfamethoxazole / trimethoprim	10 (83.3)	8 (100.0)	
Atovaquone	1 (8.3)	0 (0.0)	
Fluconazole	1 (8.3)	0 (0.0)	

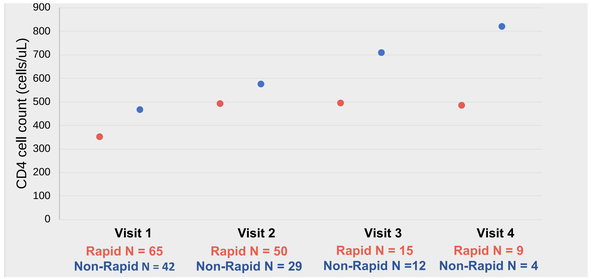

Figure 1. Median CD4 cell count at each visit for the rapid and non-rapid arm.
(P<0.001 for all comparisons)

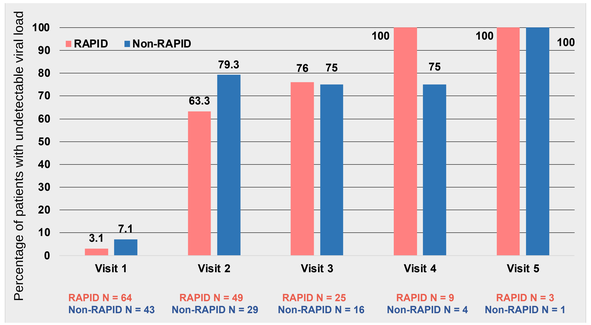

Figure 2. Percentage of patient who achieved undetectable viral load at each visit.
(P≥0.05 for all comparisons)

Table 3. Retention in care outcomes stratified by rapid arm and non-rapid arm.

	Prospective RAPID (BIC/F/TAF started within 7 days of diagnosis)	Prospective non-RAPID (BIC/F/TAF started in >7 days of diagnosis)	P-value
Visit 2			
Retained at 2nd visit, N (%)	50/55 (90.9)	31/41 (75.6)	0.050
Time to Visit 2, days (median [IQR])	43.5 [35.3, 58.3]	63.0 [48.5, 122.5]	**0.001**
Visit 3			
Retained at 3rd visit, N (%)	24/38 (63.2)	16/32 (50.0)	0.387
Time to Visit 3, days (median [IQR])	118.0 [99.5, 141.8]	238.5 [156.8, 250.0]	**0.002**
Visit 4			
Retained at 4th visit, N (%)	9/16 (56.3)	2/22 (9.1)	**0.003**
Time to Visit 4, days (median [IQR])	192.0 [185.0, 238.0]	243.5 [180.2, 306.8]	0.885

CONCLUSION

This study demonstrated that the rapid initiation of ART among a newly-diagnosed HIV patient population led to improved retention in care, which was the primary focus surrounding this intervention. The rapid arm participants also had fewer missed visits compared to the non-rapid arm.

In comparison, we did not observe any significant differences in clinical outcomes among the two prospective arms. The rapid-start arm did have a significantly lower CD4 count at baseline, which may account for why this group had an overall lower CD4 count at subsequent visits as compared to the non-rapid arm.

Our results also indicate that the rapid initiation of ART does not result in higher rates of viral suppression at 1 year, though 100% of patients in both arms had achieved viral suppression at that milestone.

One conclusion is that the rapid initiation of ART does result in improved retention, which is essential to improving long-term health of people living with HIV, and in decreasing transmission. However, it is unclear how much of this difference in retention is due to the intervention itself, versus the natural selection of patients with greater barriers to adherence into the non-rapid arm.

Nevertheless, both arms had a significant percentage of racial minorities and women, indicating that the rapid start intervention is an effective means of improving retention among the high-risk populations in our geographical region.

As the study progresses and we collect more data on retention in care, we hope to determine if there are specific subgroups of our population that benefit most or least from the rapid initiation of ART.

Future studies should also look to examine if rapid initiation would improve retention in patients with a known HIV diagnosis who have previously fallen out of care, as these patients are at high risk of HIV-related complications and new transmissions.

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