

Similar Immunologic Responses to Modern HAART Among Injection Drug Users (IDU) and Non-IDU in a Populational Setting

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Abstract

Background There has been considerable controversy regarding the use of HAART among individuals with a history of injection drug use (IDU), as they may be less likely to adhere to HAART, and therefore less likely to experience virologic and immunologic responses. Here we examine the impact of IDU status and a series of clinical indicators on immunologic response.

Methods

We assessed outcomes of treatment naive adults (≥18 years old) initiating HAART after the year 2000. We defined our clinical indicators as: (1) Having <3 versus ≥3 CD4 count measurements in the first year of follow-up; (2) Having <3 versus ≥3 viral load measurements in the first year of follow-up; (3) Having a genotypic resistance testing done at baseline requested by the enrolling physician in samples with viral load >250 copies/mL; (4) Having started therapy with <200 cells/mm³ CD4 cell count; (5) Having started on non-recommended HAART; (6) Having achieved viral suppression at 6 months since therapy initiation. We also adjusted our model for sex, age, CD4 cell count and viral load at baseline and adherence to therapy during the first 6 months. Immunologic response was defined as the percent change in the 12-month CD4 cell count from the CD4 at baseline. We used partial proportional odds model, given that our response was categorized as percent change ≥100%, percent change >0% and <100% and percent change ≤0%.

Results

402 (N=1633; 25%) patients reported IDU status. IDUs were more likely to be female, younger, have adherence <95% during the first 6 months, <3 CD4 cell count and <3 viral load measurements during the first year on HAART, having started HAART with a CD4 cell count 160 cells/mm³, and against all odds, being able to achieve suppression at 6 months since the initiation of HAART (p<0.01). The multivariate model estimated that IDUs versus non IDUs immunologic responses did not differ significantly when stratified by the clinical indicators. Of note, as seen in the table, IDUs and non-IDUs had similar overall responses to HAART when stratified by adherence rates.

Conclusions

Our results demonstrate that IDUs and non-IDUs have similar immunologic outcome on modern HAART. Therefore, it is important that physician's perceptions be modified regarding the benefits of HAART in the IDU population, so that we reduce premature and avoidable HIV/AIDS morbidity and mortality in this population.

Background and Objectives

- Modern antiretroviral therapies (i.e. highly active antiretroviral therapy [HAART]) have made long-term suppression of HIV-1 RNA plasma viral load (hereafter viral load) possible, thereby preventing drug resistance and rapid clinical disease progression, and enabling immune reconstitution.

- Because of volatility in the life of HIV-positive individuals with illicit drug addiction, some healthcare providers believe that these individuals will not derive the full benefits of HAART.

- Here we examine the impact of having a history of injection drug use (IDU) and a series of clinical indicators on immunologic response.

Methods

- Data from study participants were extracted from the British Columbia Centre for Excellence in HIV/AIDS (the Centre) monitoring and evaluation system.

- Eligible study participants were ≥18 years old at enrollment, naive to antiretroviral therapy when they started HAART since January of 2000. Participants started HAART between January 1, 2000 and June 30, 2006, were followed until June 30, 2007.

Methods, cont'd.

- Centre's guidelines have remained consistent with those put forward by the International AIDS Society-USA since 1996. In this study, we used the IAS-USA guidelines from the year 2006 as reference.

- Immunologic response was defined as the percent change in the 12-month CD4 cell count from the CD4 at baseline, and categorized: ≥100%, >0% and <100% and ≤0%.

- We defined our clinical indicators as:

- Having <3 versus ≥3 CD4 count measurements in the first year of follow-up;
- Having <3 versus ≥3 viral load measurements in the first year of follow-up;
- Having a genotypic resistance testing done at baseline requested by the enrolling physician in samples with viral load >250 copies/mL;
- Having started on non-recommended HAART according to the IAS-USA guidelines in 2006;
- Having achieved viral suppression (viral load <50 copies/mL) at 6 months since therapy initiation.

- We fitted a partial proportional odds model for history of IDU, adjusted for sex, age, CD4 cell count and viral load at baseline and adherence to therapy during the first 6 months based on prescription refills.

Results

- Based on bivariate analysis (Table 1), those with a history of IDU were more likely to experience a lower increase in CD4 cell count from baseline, to be female, <95% adherent, younger, lower CD4 cell count at baseline, < 3 measurements of viral load and CD4 cell count during the first year of HAART, and not achieving suppression at 6 months.

- However, when IDU status was regressed on the % change in the 12-month CD4 cell count from baseline (Table 2), adjusting for all variables in Table 1, the estimated probabilities for each of the strata of the outcome variable were very similar between those with and without a history of IDU.

Conclusions

- Our results show that after adjusting for several important factors that can influence the impact of having a history of IDU on immunologic response, those with and without a history of IDU obtained similar increase in CD4 cell count after 1 year on HAART. Thus, demonstrating that those with a history of IDU are as likely as those without such a history to benefit from antiretroviral therapy.

Table 1: Cohort characteristics by history of IDU

List of Variables	History of Injection Drug Use		p-values
	No N=1231	Yes N=402	
Outcomes			
Change in the 12-month CD4 cell count from baseline			
Median (Interquartile range)	150 (60 - 280)	80 (0 - 190)	<0.001
Percent change in the 12-month CD4 cell count from baseline			
Median (Interquartile range)	96 (32 - 232)	58 (0 - 173)	<0.001
Percent change in the 12-month CD4 cell count from baseline, n(%)			
≥100%	606 (79.7%)	154 (20.3%)	<0.001
>0% and <100%	443 (75.9%)	141 (24.1%)	
≤0% and <100%	182 (63.0%)	107 (37.0%)	
Demographic and Clinical Characteristics			
Gender, n(%)			
Male	1073 (79.6%)	275 (20.4%)	<0.001
Female	158 (55.4%)	127 (44.6%)	
Adherence to therapy (6-month), n(%)			
≥ 95%	1004 (79.8%)	254 (20.2%)	<0.001
< 95%	227 (60.5%)	148 (39.5%)	
Age (years)			
Median (Interquartile range)	41 (35 - 49)	40 (35 - 46)	0.003
Baseline plasma HIV-1 RNA level (log₁₀ copies/mL)			
Median (Interquartile range)	5.0 (4.6 - 5.0)	5.0 (4.5 - 5.0)	0.448
Baseline CD4+ cell count (cells/mm³)			
Median (Interquartile range)	170 (80 - 265)	160 (70 - 240)	0.026
Clinical Indicators			
Number of CD4+ cell count measurement (1 st year), n(%)			
≥3	1135 (76.7%)	344 (23.3%)	<0.001
<3	96 (62.3%)	58 (37.7%)	
Number of plasma HIV-1 RNA level measurement (1 st year), n(%)			
≥3	1151 (77.7%)	330 (22.3%)	<0.001
<3	80 (62.6%)	72 (47.4%)	
Having a baseline resistance test, n(%)			
Yes	709 (74.0%)	249 (26.0%)	0.130
No	522 (77.3%)	153 (22.7%)	
Baseline CD4+ cell count (cells/mm ³), n(%)			
≥ 200	526 (79.2%)	138 (20.8%)	0.003
< 200	705 (72.8%)	264 (27.2%)	
Having started on a recommended HAART, n(%)			
Yes	1124 (75.4%)	366 (24.6%)	0.840
No	107 (74.8%)	36 (24.2%)	
Being suppressed at 6 months, n(%)			
Yes	1107 (78.7%)	300 (21.3%)	<0.001
No	124 (54.9%)	102 (45.1%)	

Table 2: Estimated probabilities from the multivariate model by history of IDU, suppression at 6 months and 6-month adherence

Adherence at 6 months	Achieved suppression at 6 months	History of IDU	The most likely % change in the 12-month CD4 cell count from baseline	Median probability of obtaining the % change in the 12-month CD4 cell count from baseline (interquartile range)
≥95%	Yes	No	≥100%	0.64 (0.31 - 0.83)
≥95%	No	No	>0% and <100%	0.55 (0.22 - 0.84)
≥95%	Yes	Yes	>0% and <100%	0.45 (0.30 - 0.50)
≥95%	No	Yes	>0% and <100%	0.46 (0.28 - 0.47)
<95%	Yes	No	>0% and <100%	0.47 (0.29 - 0.56)
<95%	No	Yes	>0% and <100%	0.45 (0.26 - 0.47)
<95%	No	No	≤0%	0.54 (0.39 - 0.66)
<95%	Yes	Yes	≤0%	0.64 (0.50 - 0.81)



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