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Background

Socio-demographic and clinical circumstances may prevent individuals living with HIV from achieving virologic suppression. The aim of this analysis is to investigate factors associated with virologic suppression among a national cohort of individuals on HAART in Canada.

Methods

Individuals included in this study had HIV-1 plasma viral load (VL) and CD4 measurements within 6 months of beginning therapy. Univariate and multivariate analyses were done using piecewise survival exponential models where time scale was divided into intervals (<10 months and ≥10 months), where hazard was assumed to be constant within each interval but may vary across the intervals. Virologic suppression was defined as the time to the first of at least 2 consecutive HIV-1 plasma VL measurements below 50 c/mL.

Cohorts contributing data were: BC Centre HIV/AIDS Drug Treatment Program, Ontario Cohort Study, Montreal Chest Institute Immunodeficiency Cohort, The Electronic Anti-retroviral Therapy (EARTH), the IDTC Clinique Médicale l'Actuel, The Canadian HIV/HCV Co-infection Cohort Study, Maple Leaf Medical Clinic, Toronto General Hospital and University of Ottawa.

Results

There were 3706 people who met the criteria for this sub-study sample.

Table 1 shows a breakdown of the CANOC participants. As of April 2009, there are 4790 people enrolled with a median age of 40 (CI, 34-46)

As shown in **Figure 1**, the estimated probability of virologic suppression by 6 months was 57.2%. The median time to suppression was 4.5 months (IQR 3.0-7.9).

Table 2 shows that in the multivariable analyses adjusting for age, baseline CD4, AIDS at baseline, women ([HR] 0.81, 95% [CI] 0.73-0.90) and individuals with a history of IDU (HR 0.60, CI 0.54-0.67) were less likely to suppress.

Patients with lower VL were more likely to suppress (3 - <4 log₁₀ c/mL [HR 1.79, CI 1.55-2.07] and 4 - <5 log₁₀ c/mL [HR 1.28, CI 1.17-1.39]) than patients with baseline VL > 5 log₁₀ c/mL.

Patients using 2 NRTIs+NNRTI (HR 1.61, CI 1.39-1.85), 2 NRTIs+ boosted PI (HR 1.69, CI 1.46-1.95) or 3 NRTIs (HR 1.46 (CI 1.16-1.83) times more likely to suppress than those using 2 NRTIs+PI single.

Table 1: Characteristics of the CANOC Cohort

Variable	Overall (n=4790 ^(a))
Naïve Start of ARV^(b)	
Year 2000-2002	1694 (35.4%)
Year 2003-2005	1922 (40.1%)
Year 2006-2008	1174 (24.5%)
Male	3851 (80.4%)
Baseline Age (Years)	
Median	40
IQR	34 - 46
Baseline CD4 Count (cells/mm³)	
Median	192
IQR	100 - 280
Baseline pVL (c/mL)	
Median	80,500
IQR	21,300 - >100,000
First Therapy	
Total	4790
Nuc 2, NN	1966 (41.0%)
Nuc 2, PI Boosted ^(c)	1860 (38.8%)
Nuc 2, PI Single	475 (9.9%)
Nuc 3	170 (3.5%)
Other	319 (7.6%)
Baseline AIDS	574 (12.0%)
Unknown/No ADI Diagnosis	4023
Injection Drug Use Ever	769 (16.1%)
Missing/Unknown	791
Tested for Hep C antibodies	3693 (77.1%)
Missing/Unknown	1638
Positive for HCV antibodies (Among those tested)	914 (24.8%)
First Nation Descent^(d)	171 (7.8%)
(Among those with known ethnicity)	
Follow-up Time (months)	
Median	39.3
IQR	16.2 - 59.4

(a) To Meet lab requirements a patient must have started naïve on antiretroviral therapy on or after 01 Jan, 2000 and must have a baseline CD4 and baseline pVL within the six months prior to their naïve start date.
 (b) Have used the Clinic First ARV date as the naïve ARV start date for the MUHC and IDTC cohorts
 (c) PI boosted = One PI + ≤ 400 mg.day Ritonavir
 (d) First Nation Descent includes those individuals who are of "Mixed" race and have identified as being descended from First Nations people

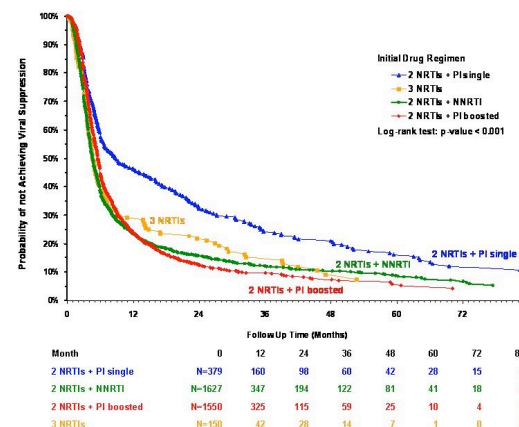
Table 2: Multivariable analysis adjusting for age

Variable	HR	95% CI	P value
Gender			
Male	1.00	-	< 0.001
Female	0.81	(0.73, 0.90)	
Age (every 10 year change)	1.11	(1.07, 1.15)	< 0.001
Baseline Viral load (Log10 (c/mL))			
≥ 5	1.00	-	< 0.001
[4, 5)	1.28	(1.17, 1.39)	
[3, 4)	1.79	(1.55, 2.07)	
< 3	1.22	(0.95, 1.58)	
Baseline CD4 count (cells/mm³)			
≥ 200	1.00	-	0.281
[100, 200)	1.02	(0.93, 1.11)	
[50, 100)	1.04	(0.91, 1.18)	
< 50	0.91	(0.80, 1.03)	
AIDS at baseline			
No	1.00	-	0.006
Yes	1.17	(1.05, 1.32)	
History of IDU			
No	1.00	-	< 0.001
Yes	0.60	(0.54, 0.67)	
Regimen			
2 NRTIs + PI single	1.00	-	< 0.001
2 NRTIs + NNRTI	1.61	(1.39, 1.85)	
2 NRTIs + PI boosted	1.69	(1.46, 1.95)	
3 NRTIs	1.46	(1.16, 1.83)	
Interval (cutoff for the piecewise exponential model)			
Time of Followup ≥ 10 months	1.00	-	< 0.001
Time of Followup < 10 months	3.17	(2.87, 3.51)	

Conclusions

Individuals on boosted PI regimens or NNRTI regimens were more likely to suppress than patients on unboosted PI regimens. Women and individuals with a history of IDU were less likely to achieve virologic suppression.

Figure 1: Probability of Not Suppressing by HAART Regimen



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