CD4+ Counts at Baseline Predicts Increases in Immune Response among HIV Patients on Antiretroviral Therapy at Yogyakarta, Indonesia: A Retrospective Longitudinal Study

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INTRODUCTION

HIV remains an important public health issue in Indonesia with the number of new HIV infections in continuing to rise. Globally, the increasingly widespread use of antiretroviral therapy (ART) has decreased morbidity and mortality related to HIV infection. ART also has an important role in preventing transmission.[1][2]

Patient and environment factors have been found to influence immune response.[4,5] Very few similar studies have been conducted previously in Indonesia, and none in Yogyakarta. This study aims to examine factors that may predict CD4+ cell increase within the first 12 months of ART among patients with HIV in a tertiary referral hospital in Yogyakarta, Indonesia.

METHODS

Study Design

A retrospective cohort study was carried out among HIV patients who started ART during January 2008- June 2012 in Dr.Sardjito referral hospital at Yogyakarta- Indonesia, aged 18 years or older, with CD4+ counts less than 200 cells/µl at baseline and who were not pregnant.

CD4+ count for each patient was observed within 12 months after starting ART. Immunological success was defined as CD4+ count ≥200 cells/µl at 12 months after starting ART.

Statistical Analysis

Kaplan- Meier and Cox Proportional Hazard analyses were performed to predict factors associated with achieving a CD4 count greater than or equal to 200 cells/µl. Data analyses were performed using Stata 12.1 (Stata Corporation, College Station, Texas).

RESULT

Baseline Characteristic

A total of 222 patients met inclusion criteria for inclusion in the study, of whom 37.3% were female; the median age was 32 years (IQR 28-40). The median CD4⁺ count at the time of ART initiation was 41 cells/µl (IQR 13-105); 55% counts less than 50 cells/µl. Clinically, 88.52 % were WHO stage III and IV at baseline.

Survival Analysis

Out of the 222 patients during the 12 months after starting ART two died, 14% were lost to follow up, and 4% were transferred out within 12 months. The cohort contributed to a total of 2115.93 person-months of follow up time.Eighty patients (36%) achieved a CD4+ count ≥ 200 cells/µl within 12 months of staring treatment. The rate of CD4+ count achieved ≥ 200 cells/µl was 3.78 per 100 person months (Figure 1).

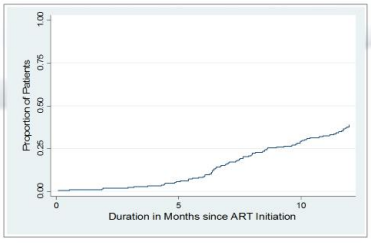

Figure 1. Kaplan-Meier plots showing time to achieve CD4+ count ≥ 200 /ml within 12 months

Predictors of Immune Increase

Univariate analysis: Female sex (p=0.003), heterosexual (p=0.028), WHO clinical stage I/II (p=0.036), working functional status (p=0.02) and higher CD4⁺ count at baseline (p<0.001) were associated with increasing CD4 count.
Multivariate analyses: Only CD4⁺ count at baseline was the only significant independent predictor of CD4⁺ count increase (HR: 2.78, 95% CI 1.55-4.98, p<0.001) (Table 1)

Table 1. Multivariate Analysis for achieving CD4 Count ≥ 200/ml within 12 months

	Crude Hazard Ratio on Univariate Analysis (95% CI)	P Value	Adjusted Hazard Ratio on Multivariate Analysis (95% CI)	P Value
Sex		0.003		0.359
Male	1.00		1.00	
Female	1.96 (1.26-3.03)		1.26 (0.77-2.08)	
Risk Group		0.028		0.154
Heterosexual	1.00		1.00	
IDU	0.32 (0.14-0.71)		0.46 (0.19-1.07)	
Homosexual	0.76 (0.30-1.91)		0.67 (0.25-1.79)	
Unknown	1.01 (0.60-1.69)		1.13 (0.67-1.90)	
Clinical Stage		0.036		0.378
WHO Stage I/II	1.00		1.00	
WHO Stage III/IV	0.62 (0.39-0.97)		0.82 (0.50-1.33)	
Unknown	0.75 (0.27-2.10)		0.95 (0.28-3.19)	
Baseline CD4 (cells/µL)		<0.001		0.001
<50	1.00		1.00	
50-99	2.02 (1.07-3.79)		1.62 (0.83-3.16)	
100-200	4.09 (2.49-6.74)		2.78 (1.55-4.98)	
Functional Status		0.002		0.15
Working	1.00		1.00	
Ambulatory	0.43 (0.24-0.76)		0.43 (0.24-0.77)	
Unknown	0.47 (0.15-1.49)		0.49 (0.13-1.93)	

CONCLUSION

Low CD4⁺ count at baseline is an important risk factor for poor immunological response in this setting area. Strategies that increase early HIV testing, diagnosis and treatment are important to reduce late presentation and low CD⁺ count at baseline for achieving treatment success.

ACKNOWLEDGMENT

- This research project was been funded under the Australian Aid, Regional HIV Capacity Building Program. The views expressed in this publication do not necessarily represent the position of the Australian Government.
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