Investigating the Determinants of Mortality Before Cd4 Count Recovery in a Cohort of Patients Initiated on Antiretroviral Therapy in South Africa Using a Fine and Gray Competing Risks Model

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Abstract

CD4 count recovery is the main goal for an HIV patient who initiated ART. Some patients respond positively to ART and attain CD4 count recovery, some patients might fail to recover their CD4 count due to non-adherence, treatment resistance, and virological failure, leading to HIV-related complications and death. The purpose of this study is to find the determinants of death in patients who failed to recover their CD4 count after initiating antiretroviral therapy. The data used in this study was obtained from KwaZulu-Natal, South Africa, where 2528 HIV-infected patients with a baseline CD4 count of $\square$200 cells/mm $\square$ were initiated on ART. We used a Fine-Gray sub-distribution hazard and cumulative incidence function to estimate potential confounding factors of death, where CD4 count recovery was a competing event for failure due to death. Patients who were not suffering from tuberculosis were 1.33 times at risk of dying before attaining CD4 count recovery [aSHR 1.33; 95% CI (0.96-1.85] compared to those who had no tuberculosis. Rural patients had a higher risk of not recovering and leading to death [aSHR 1.97; 95%CI (1.57-2.47)] than those from urban areas. The patient's tuberculosis status, viral load, regimen, baseline CD4 count, and location were significant contributors to death before CD4 count recovery. Intervention programs targeting HIV testing in rural areas for early ART initiation and promoting treatment adherence are recommended.

Keywords: fine-gray model; competing risk; mortality; CD4 count recovery; cumulative incidence