Characteristics and Determinants of T-Cell Phenotype Normalization in HIV-1 Infected Individuals Receiving Long-Term Antiretroviral Therapy

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Objective

This study examined the incidence and predictors of complete T-cell phenotype (TCP) normalization in antiretroviral-naïve HIV-positive patients initiating combination antiretroviral therapy (cART).

Main Finding

Regardless of successful cART, complete TCP recovery was extremely rare. HIV-triggered changes of the TCP are incompletely reversed by long-term antiretroviral use.

Background

- Healthy immune systems are characterized by the maintenance of T-cell homeostasis and a balanced TCP.
- Impaired T-cell homeostasis and extreme immune dysregulation are frequently observed during the course of an HIV infection.
- T-cell homeostasis is linked to decreased resistance to infections, which causes increased morbidity & mortality.

Importance of this Study

- cART has caused sustainable reductions in HIV viral loads and improved CD4 cell counts.
- Despite the proven medical benefits of cART, this treatment may not lead to complete recovery of the TCP because altered T-cell homeostasis may persist.
- In HIV-infected individuals, the potential risks for comorbidities from failure to restore T-cell homeostasis are unknown.
- Few studies have assessed the effect of long-term successful cART on altered T-cell homeostasis and T-cell ratio dysregulation.

How this Study was Conducted

- Data were analyzed from the CANOC collaboration, an interprovincial collaborative cohort of HIV-positive individuals on antiretroviral therapy in Canada.
- CANOC compiled HIV clinical, virological, immunologic, and demographic data from 8 cohorts across British Columbia, Ontario, and Quebec.
- 4,459 participants from the CANOC collaboration were included in this analysis. All individuals had an altered TCP at baseline, and were studied for a median duration of 3.14 years.
- Abnormal TCP was defined as either having a low CD4 T-cell count, lost T-cell homeostasis, or CD4:CD8 ratio dysregulation.

Study Results

- A third of the study population restored their CD4 T-cell counts.
- 68% achieved T-cell homeostasis.
- Only 85 patients (2%) normalized all the components of the TCP during the study period.
- CD4 T-cell counts and HIV viral load suppression had a statistically significant effect on normalization.

Implications

- These findings highlight the potential role of T-cell homeostasis as an independent marker of HIV disease progression and AIDS onset.
- The data presented in this study reflects the need for more research into this complex area of long-term HIV management.