HIV patients under suppressive antiretroviral therapy present with various patterns of immune activation: the ACTIVIH study

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Résumé

Background: HIV infection induces an immune activation fuelled by several causes that may occur in various combinations. These causes are reduced under highly active antiretroviral therapy (HAART), but usually not abolished. In the ACTIVIH study, we analyzed whether immune activation is qualitatively the same for all efficiently treated patients or whether different patterns of immune activation may be identified.
Methods: To this aim, we measured in 120 HIV-positive adults, aviremic under HAART for at least 2 years, 55 cell surface and soluble markers of inflammation, and CD4+ T cell, CD8+ T cell, B cell, NK cell, monocyte, and neutrophil activation. We clustered the dataset using two independent hierarchical clustering analyses: one for variables using the 1-r^2 (where r is the linear correlation coefficient) as a distance between variables, and one for observations using usual Euclidean distance measured on scaled variables for observations.

Results: The level of many markers of immune activation were increased, but not altogether in a given patient. We identified various subpopulations of patients according to their pattern of immune activation (Figure). Using ANOVA results corrected by False Discovery Rate for multiple testing, more than 90% of variables were on average significantly different for at least one subpopulation of patients with regards to the other ones (p-value $<$ 0.05).
Conclusions: These different patterns of immune activation may be the result of different causes, and may result in different pathogenic consequences. A better understanding of the links between causes, patterns, and consequences of immune activation in virologic responders might pave the way to the identification of markers predictive of specific comorbidities, and to an etiologic and/or symptomatic immunosuppressive therapeutic approach tailored to each subpopulation of patients.

Mots-Clés: inflammation, virologic responder, biomarker

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