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Potent Antiretroviral Therapy Reduces Endothelial and Coagulation Activation in HIV-1 Infected Patients

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BACKGROUND

Infection with HIV-1 may cause endothelial- or coagulation activation as well as platelet stimulation. Antiretroviral therapy can secondarily cause hyperlipidemia. Thus both HIV-infection as well its treatment are associated with conditions linked with potential development of atherosclerosis.

OBJECTIVE

To assess the association of endothelial- and coagulation activation and platelet stimulation in HIV-infected patients before and after initiation of highly active antiretroviral therapy (HAART).

PATIENTS AND METHODS

Analysis of endothelial activation markers, i.e. soluble vascular cell and intercellular adhesion molecules (sVCAM-1 and sICAM-1), von Willebrand factor (vWF) and thrombomodulin (TM), coagulation markers, i.e. d-dimers (DD) and thrombin-antithrombin-III-complex (TAT) and platelet activation markers, i.e. CD40 ligand (CD40L) and sP-selectin (sP-sel) in prospectively stored citrated plasma samples of 41 patients from the Swiss HIV Cohort Study before and at least 5 months after initiation of successful HAART in comparison to 21 healthy controls.

RESULTS

41 HAART-naïve patients (m=31, f=10), receiving HAART containing either a protease inhibitor (PI, n=21) or a non-nucleoside reverse transcriptase inhibitor (NNRTI, n=20) were investigated. Before treatment mean log viral load was 4.3 (±1.1) and mean CD4 cells/µl 245 (±166), after at least 5 months of HAART the corresponding values were 1,4 (±0,8) and 483 (±225) respectively. Endothelial activation markers (VCAM-1, ICAM-1 and vWF) were significantly higher in patients than controls and decreased significantly with HAART ($p<0.01$). DD, a coagulation marker, although initially within normal range, decreased significantly with treatment ($p<0.001$). HAART did not lower levels of platelet activation markers (CD40L and sP-sel), although these were significantly higher in patients than controls ($p<0.001$). Results were independent of either PI or NNRTI treatment.

CONCLUSION

HIV-infection is associated with significant elevation of markers of endothelial and platelet activation and to a lesser content coagulation markers and might be associated with a hypercoagulable state. HAART induced a decrease of markers of endothelial and coagulation activation, indicating a potential reduction in inflammatory mechanisms. This might counterbalance the effects of HAART-induced hyperlipidemia and thereby protect from development of atherosclerosis.