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PREDICTORS OF ATHEROSCLEROSIS AND ATHEROSCLEROTIC PROGRESSION IN PATIENTS WITH HIV: THE ROLE OF TRADITIONAL AND IMMUNOLOGICAL RISK FACTORS

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OBJECTIVES/AIM: Preliminary evidence suggests that treated HIV patients are at increased risk for coronary events. However, the relationships among cardiovascular risk factors, HIV disease and treatment and atherosclerosis have not been well-defined. The purpose of this study was to identify predictors of carotid artery intima-media thickness (IMT), a marker of atherosclerosis, in HIV-infected patients at baseline and to follow IMT progression over 1 year.

METHODS: We measured lipids, inflammatory markers and IMT by ultrasound in a cross-sectional study of HIV-infected adults. We also assessed cardiovascular disease (CAD) risk factors, HIV disease characteristics and fat distribution. The primary endpoint was the mean maximal IMT of 12 pre-selected segments in the carotid arteries. Multivariable linear regression was used to identify independent predictors of baseline IMT and IMT progression.

RESULTS: A total of 147 HIV patients were studied; 122 patients were male. The mean age was 45 (± 8) years. The mean duration of HIV infection was 11 (± 4.5) years, the median nadir CD4 count was 110 cells/mm³ and the median duration of protease inhibitor treatment was 3.3 years. Eighty-two patients were current smokers, 34 had hypertension and eight had CAD. The mean baseline IMT was 0.90 (± 0.30) mm, which was higher than the IMT obtained from an age-matched HIV-negative control group of 63 subjects, 0.70 (± 0.20 , $P=0.0001$) mm. Multivariable predictors of baseline IMT were: age ($P<0.001$); low-density lipoprotein (LDL) cholesterol ($P=0.002$); cigarette pack years

($P=0.001$), Latino race ($P=0.047$), nadir CD4 ≤ 200 ($P=0.072$) and hypertension ($P=0.091$). When the control group was added to the analysis, HIV infection was an independent predictor of IMT ($P=0.001$). The rate of progression in 79 HIV patients was 0.10 (± 0.10) mm compared to 0.01 mm in published reports of HIV-negative populations. Age ($P=0.01$), Latino race ($P=0.024$) and CD4 nadir ($P=0.049$) were multivariable predictors of IMT progression.

CONCLUSIONS: Carotid IMT is higher in HIV patients than in age-matched controls and progresses more rapidly than in published reports of HIV negative cohorts. In HIV patients, carotid IMT was associated with classic coronary risk factors, and nadir CD4 ≤ 200 . These data suggest that immunodeficiency, along with traditional cardiac risk factors, contributes to atherosclerosis in HIV-infected individuals.

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