Untreated HIV Infection Is Associated with Impaired Arterial Elasticity

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Abstract

Background: Untreated HIV infection may increase risk for cardiovascular disease (CVD). Assessment of both large and small artery elasticity (LAE and SAE) in HIV-infected patients has not been examined.

Methods: We evaluated 96 HIV-infected and 32 HIV-uninfected patients taking antiretroviral therapy (ART) and 69 HIV-infected and 16 HIV-uninfected patients not taking ART. The primary outcome was the ratio of brachial artery flow-mediated dilation (FMD), an index of endothelium-dependent dilation, to ankle-brachial index (ABI) and its component parameters. All analyses were adjusted for age, gender, race, BMI, smoking, diabetes, and hepatitis C or IDU.

Results: In HIV-infected patients, brachial FMD was lower (27.6% lower) in patients not on ART compared to those on ART (p = 0.009). As expected, those on ART had lower brachial FMD than HIV-uninfected patients (p = 0.030). In multivariable regression, lower brachial FMD was associated with higher HIV viral load (β = 0.06 [0.00–0.12], p = 0.01) and ART duration (β = 0.06 [0.00–0.12], p = 0.008), and lower ABI (β = -0.09 [0.01–0.17], p = 0.016) and LPA (β = -0.04 [0.00–0.07], p = 0.007) at baseline. No associations were found with HIV RNA levels, CD4%, or ART adherence.

Conclusions: Untreated HIV infection may impair arterial elasticity, and ART duration is associated with lower brachial FMD. Further studies are needed to understand the clinical implications of these findings.

Figure 1: Representative Radial Pulse Waveforms

Figure 2: Large and Small Artery Elasticity by HIV Status

Table 1: Demographic and Laboratory Data

Table 2: Univariate Associations with LAE and SAE

Table 3: Multivariate Associations with LAE and SAE

Discussion

• Individuals with untreated HIV infection had lower levels of LAE and SAE than HIV-negative controls, after adjusting for additional risk factors. The degree of HIV-related impairment reported in arterial elasticity is relevant for clinical risk stratification.

• These data support the notion that large arterial elasticity (or stiffness) is impaired among HIV-infected persons not receiving ART, but also reports for the first time prolonged measurement of arterial elasticity in health and its effect on the cardiovascular risk state in HIV-infected patients.

• Risk factors identified in HIV-infected patients, such as smoking, diabetes, and dyslipidemia, are highly prevalent in the general population, and their association with arterial elasticity is reflected in the observed associations between these factors and lower arterial elasticity in HIV-infected patients.

• These findings may help to inform future studies of the relationship between HIV and arterial elasticity, and could be used to guide clinical management strategies for HIV-infected patients.