Association of Adipokines with Bone Mineral Density in HIV+ and HIV- Women

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Background: HIV infection is associated with low bone mineral density (BMD) and alterations in adipose-derived hormones (adipokines) such as leptin and adiponectin. Studies in the general population suggest that adipokines may be important mediators of the relationship between fat and bone, however their association with BMD in HIV populations is unknown.

Methods: BMD of the lumbar spine (LS), total hip (TH), and femoral neck (FN) were measured by dual energy X-ray absorptiometry (DXA) at baseline and every 5 years in 403 participants (318 HIV-), 122 HIV+ enrolled in the Metabolic Substudy of the Women's Intergroup HIV Study. Serum leptin and adiponectin were assayed on stored sera. Multivariable linear mixed models were used to assess the effects of adipokines and HIV status on BMD over 5 years, adjusting for demographic, behavioral, body composition and metabolic factors, and menopausal status. Models restricted to HIV+ women also adjusted for CD4, HIV RNA, and HAART use.

Results: Compared to HIV- women, HIV+ women were older (mean 44 vs. 37 years) and more likely to be postmenopausal (26% vs. 3%). HIV+ women had lower BMI (27.6 vs. 35.0 kg/m²), and lower leptin (18 ng/mL vs. 28 ng/mL) but higher adiponectin (9.4 µg/mL vs. 6.4 µg/mL) levels at the baseline visit. In unadjusted analysis, HIV+ women had lower LS, TH, and FN BMD than HIV- women. After adjustment for demographic, behavioral, body composition and metabolic factors, HIV+ status was associated with lower BMD at the LS (-0.077 g/cm², TH (-0.044 g/cm²), and FN (-0.048 g/cm²) per 10-year visit. In unadjusted analysis, higher BMI was associated with lower BMD at the LS (-0.051 g/cm²), TH (-0.044 g/cm²), and FN (-0.048 g/cm²) per decade. Similar findings were observed after additional adjustment for leptin. Among HIV+ women, in unadjusted analyses, adiponectin was associated with lower TH BMD (-0.025 g/cm²) and FN BMD (-0.048 g/cm²) per 10-year visit. In unadjusted analysis, HIV+ women had lower LS, TH, and FN BMD than HIV- women. After adjustment for demographic, behavioral, body composition and metabolic factors, HIV+ status was associated with lower BMD at the LS (-0.077 g/cm²), TH (-0.044 g/cm²), and FN (-0.048 g/cm²) per 10-year visit. In unadjusted analysis, higher BMI was associated with lower BMD at the LS (-0.051 g/cm²), TH (-0.044 g/cm²), and FN (-0.048 g/cm²) per decade. Similar findings were observed after additional adjustment for leptin.

Conclusions: HIV infection is associated with lower LS, TH, and FN BMD among women. Serum leptin and adiponectin levels do not appear to mediate the association of HIV infection with loss of BMD, and appear to have little association with BMD among HIV infected women.