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Lipodystrophy in HIV-infected patients assessed with QCT

Abstract

Lipodystrophy in HIV-infected patients is an abnormal redistribution of adipose tissue associated with some antiretroviral therapies (ART) and includes loss of subcutaneous fat (SAT), predominantly on face and limbs, and simultaneous hypertrophy of visceral fat (VAT)[1]. Importantly, increased VAT is a well-known risk factor for metabolic diseases, in particular cardiovascular complications[1; 2]. Quantitative Computed Tomography (QCT) is one established imaging modality used in analyzing soft tissue distribution including VAT and SAT [2; 3]. The aim of this study was to quantify VAT and SAT via QCT in an HIV-infected population and compare the measurements to healthy matched controls.

Thirty-three HIV-infected patients (on stable tenofovir-based ART) and nineteen age- and BMI-matched controls were recruited (mean age: 58 +/- 4.86, mean BMI: 25.8 +/- 3.99). Axial single-slice QCT images were acquired at the abdomen (L2) and mid-thigh [120 kVp; 300mAs; 10mm slice thickness]. Images were segmented manually and lean and fat areas were calculated using the Medical Imaging Process, Analysis and Visualization (MIPAV) software[4]. Mann-Whitney tests were performed to compare VAT and SAT areas at the abdomen and thigh between HIV-infected and control groups.

HIV-infected participants presented significantly higher abdominal VAT to SAT ratio ($p < 0.05$), higher abdominal total fat area (VAT+SAT) to thigh SAT ratio ($p < 0.005$) and higher total abdominal area to total thigh area ratio ($p < 0.005$) than controls. No significant differences were found in thigh SAT or total area between HIV-infected individuals and controls. Our results are consistent with previous studies on visceral fat hypertrophy in HIV lipodystrophy, and further suggest that in our cohort increased VAT, rather than decreased abdominal or peripheral SAT, is the dominant fat distribution change in the HIV-infected population. In the future we will compare these QCT results with MRI, DXA and deuterated D₃-creatine body composition assessments of the same cohort. Further, we will investigate changes in bone, muscle, and marrow adiposity. We believe that future studies on this topic will help us to understand the background of HIV-related metabolic and skeletal complications and will result in better patient management.

HIGHLIGHTS:

HIV-infected patients and age-matched controls were examined using QCT body composition analysis. HIV-infected patients had more visceral adipose tissue, but similar abdominal and peripheral subcutaneous adipose tissue, compared to controls.

References

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Figure 1.

Visceral fat area (VAT cm^2) and subcutaneous fat area (SAT cm^2) at the abdomen for HIV-infected (light blue) and control participants (dark blue). Linear regression lines with 95% CI are shown. HIV-infected participants have higher VAT to SAT ratio compared to controls ($p < 0.05$).

