

REDUCED MUSCLE QUALITY IS HIGHLY PREVALENT IN AGING PEOPLE WITH HIV (PWH) AND IS ASSOCIATED WITH EXCESS VISCERAL ABDOMINAL FAT (EVAF)

#67

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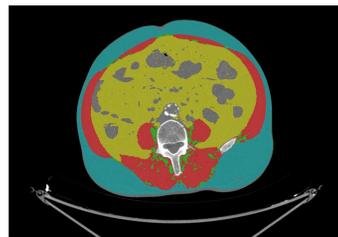
Background

- ▶ People with HIV experience accelerated aging, including faster declines in physical function when compared to those without HIV.¹
- ▶ Although multifactorial, age-related loss of skeletal muscle mass is a significant contributor to this functional decline.²⁻³
- ▶ Reductions in muscle quality tend to precede decreases in muscle mass.⁴⁻⁶

How is excess visceral abdominal fat (EVAF) associated with muscle quality in PWH in the modern ART era, compared to subcutaneous?

Methods

- ▶ The **V**isceral **A**diposity **M**easurement and **O**bservations **S**tudy (**VAMOS**) is a cross-sectional, multi-center observational study in PWH who:
 - ▶ Had virologic suppression on ART for at least 1 year; and,
 - ▶ BMI between 20 to 40 kg/m²
- ▶ **Study period:** Measurements were completed in 2023.
- ▶ Participants completed a single slice abdominal computed tomography (CT) scan at the L4-L5 level to quantify visceral and subcutaneous fat in an overnight fasting state. EVAF was defined as a visceral adipose tissue (VAT) surface area ≥ 130 cm².



Muscle quality (CT attenuation) was assessed as mean Hounsfield units (HU), a measure of muscle density, across all abdominal muscle groups.

CT scan (left) shows VAT (yellow), SAT (blue), muscle (red), and intermuscular adipose tissue (IMAT, green).

- ▶ **Statistical analysis:** Relationships with EVAF were assessed by Spearman correlation coefficients, as well as Kruskal-Wallis and Dunn's tests.

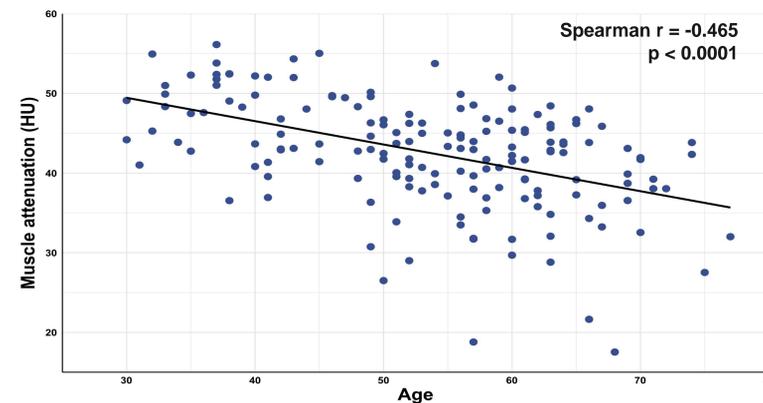
Results

Study Population

- ▶ 170 participants had paired CT scans and lab measurements. 89% were male, 70% white, with a mean age of 54 years.
- ▶ The prevalence of EVAF was 58%. Median (IQR) VAT area was 148 cm² (94, 218).

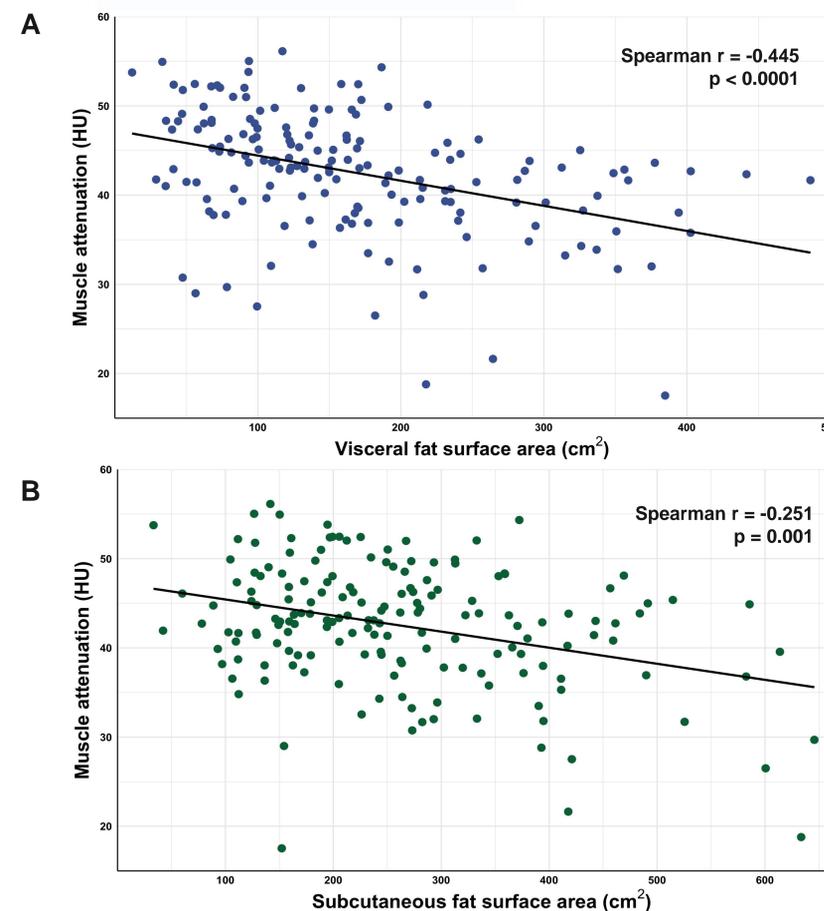
Results

Figure 1: Total muscle quality decreases with increasing age.



Spearman correlation analysis found a significant inverse relationship between age and muscle quality.

Figure 2: Visceral abdominal fat area has a stronger correlation with muscle quality than subcutaneous fat area in PWH.



A Spearman correlation was performed to determine the associations between visceral (A) and subcutaneous (B) abdominal fat levels and muscle quality, as measured by CT scan. Increasing visceral fat surface area was strongly correlated with lower muscle quality (A: $r = -0.445$; $p < 0.0001$) while SAT showed a weaker inverse correlation (B: $r = -0.251$; $p = 0.001$).

Results (continued)

Figure 3: Muscle quality did not significantly differ by BMI category.

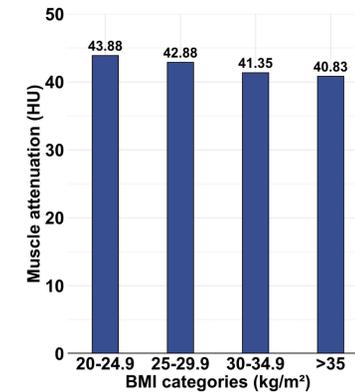
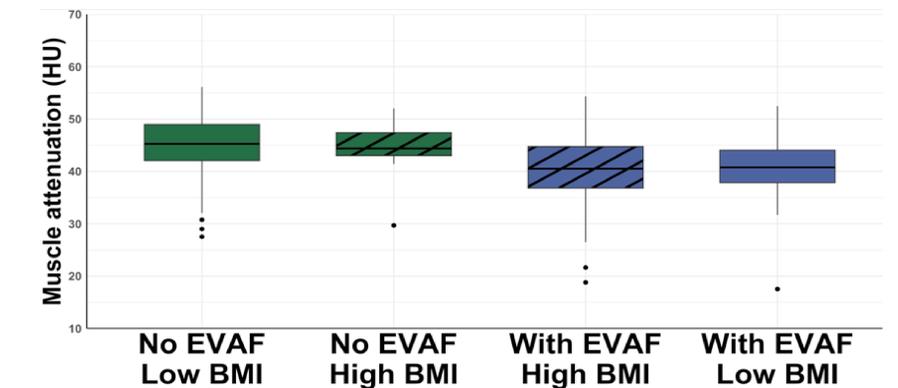


Table 1. Distribution of participants by presence of EVAF and/or obesity (by BMI).

| | No EVAF (VAT < 130 cm ²) | With EVAF (VAT > 130 cm ²) |
|--|--------------------------------------|--|
| Pts without obesity (BMI 20-29.9 kg/m ²) | 62 (36%) | 52 (31%) |
| Pts with obesity (BMI 30-40 kg/m ²) | 10 (6%) | 46 (27%) |

- ▶ To explore relationships between BMI, EVAF and muscle quality, four distinct groups were created (Table 1).

Figure 4: Lower muscle quality is seen in patients with high EVAF regardless of their BMI.



Kruskal-Wallis tests were used to assess whether there is a significant difference in muscle quality across the four groups. ($\chi^2(3) = 22.54$, $p < 0.0001$).

- ▶ A statistically significant difference in muscle quality was found between the groups ($\chi^2(3) = 22.54$, $p < 0.0001$), where individuals with EVAF had lower muscle quality than those without EVAF, regardless of their BMI.

Conclusions

- ▶ Increased levels of visceral fat are associated with reduced muscle quality to a greater extent than increasing BMI or subcutaneous fat among PWH on modern ART regimens, which may amplify age-related declines in muscle quality and quantity.

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¹Schrack et al, JAIDS 2015; ²Grant et al, AIDS 2016; ³Debroy et al, Antivir Ther 2019; ⁴Delmonico et al, Am J Clin Nutr 2009; ⁵Goodpaster et al, J Gerontol A Biol Sci Med 2006; ⁶Hughes et al, J Gerontol A Biol Sci Med 2001.