#453 CARDIOVASCULAR RISK SCORES AND INSULIN RESISTANCE ARE HIGHER WITH EXCESS VISCERAL ABDOMINAL FAT IN PEOPLE WITH HIV IN THE MODERN ANTIRETROVIRAL ERA

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Background

- People with HIV (PWH) are at an increased risk of cardiovascular disease (CVD), even after accounting for traditional risk factors like diabetes and dyslipidemia.[1-3]
- Metabolic syndrome (MetS), a component of which is central adiposity, is also increasingly prevalent in PWH.[4]
- There are few data on the contribution of excess visceral abdominal fat (EVAF) to increased CVD risk in PWH in the modern ART era.
- Relative states of Growth Hormone (GH) deficiency have been shown in individuals with obesity, particularly those with increased visceral adipose tissue.[5] These relationships have also not been explored in PWH in the modern ART era.

How does excess visceral abdominal fat impact traditional CVD risk factors and overall CV risk in PWH in the modern ART era?

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/m^2
- *Study period:* Measurements were completed in 2023.
- Participants completed study visits, labs, and an abdominal computed tomography (CT) scan in the overnight fasting state.
- EVAF was quantified via CT abdominal scan at the L4-5 vertebrae and defined as a visceral adipose tissue (VAT) surface area ≥130 cm^2. Growth hormone (GH) levels, Homeostatic Model Assessment for Insulin Resistance (HOMA-IR), and triglyceride-high density lipoprotein (TG:HDL) ratios – an alternative measure of insulin resistance – were also analyzed.
- *Statistical analysis:* Relationships with EVAF were assessed by Wilcoxon Two-Sample Tests and Spearman correlation coefficients.

Results

Study Population

- 170 participants had paired CT scans and lab measurements, at the time of this analysis. 89% were male, 70% white, with a mean age of 54 years.
- **The median VAT surface area among participants was 148 cm^2 (94, 218), with an EVAF prevalence of 58%.**

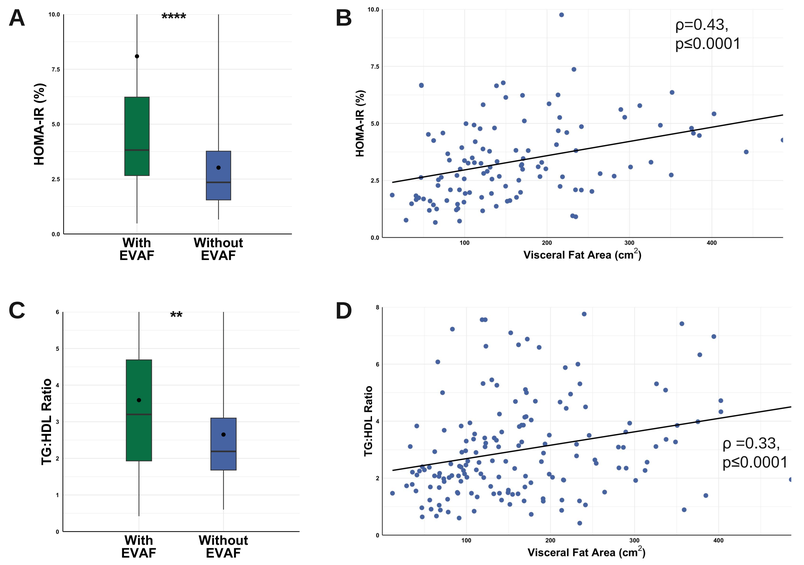
Results

Table 1: Clinical characteristics of study participants with and without EVAF.

	Participants with EVAF (n=98)	Participants without EVAF (n=72)	p-val*
Components of ASCVD risk score – *categorical* †			
Sex			0.027
Male	92 (60.5)	60 (39.5)	
Female	6 (33.3)	12 (66.7)	
Race			0.017
White	77 (64.7)	42 (35.3)	
Black	16 (41.0)	23 (59.0)	
Other	4 (40.0)	6 (60.0)	
Diabetes status - Yes	19 (79.2)	5 (20.8)	0.021
Treatment for HTN - Yes	51 (67.1)	25 (32.9)	0.025
Smoking status – Yes	52 (65.0)	28 (35.0)	ns
Components of ASCVD risk score – *continuous* ‡			
Age (yr)	57 (9.3)	49 (11.4)	<0.0001
Total cholesterol (mg/dL)	166.5 (41.7)	182.2 (38.2)	0.017
HDL (mg/dL)	46.44 (16.5)	49.08 (13.0)	0.015
Systolic blood pressure (mmHg)	125.08 (14.6)	119.55 (14.0)	0.014
10-year ASCVD risk score	19.82 (17.8)	12.27 (13.5)	0.0001
Lifetime CVD risk score	51.20 (15.1)	43.48 (16.8)	0.0166
Triglycerides (TG; mg/dL)	145.44 (68.4)	114.99 (52.1)	0.0008

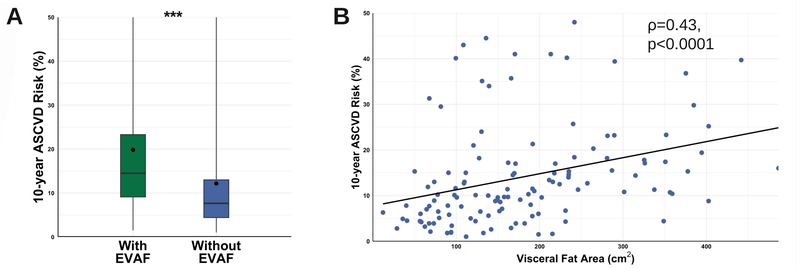
*: Chi-square results for categorical variables;†: values reported as n (%); Wilcoxon two-sample test results for continuous variables; ‡: values reported as Mean (SD).

Figure 1: HOMA-IR and TG:HDL ratios increase with increasing levels of visceral abdominal fat in PWH.



Higher levels of visceral fat surface area are associated with higher levels of insulin resistance, as measured by HOMA-IR (A: p≤0.0001; B: ρ=0.43, p≤0.0001), as well as TG:HDL ratios (C: p=0.0013; D: ρ =0.33, p≤0.0001). Wilcoxon Two-Sample tests were performed for dichotomous EVAF (EVAF as Visceral Fat Area ≥130 cm^2; A,C). Spearman correlations were performed to determine the associations between visceral abdominal fat surface area levels and measures of insulin resistance (B, D).

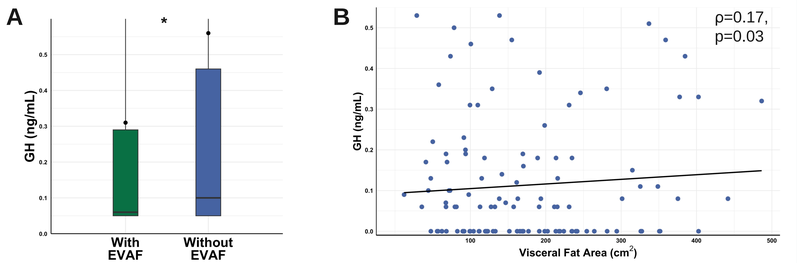
Figure 2: Higher levels of visceral fat area are associated with higher 10-year ASCVD risk in PWH.



Participants with EVAF had significantly higher 10-year ASCVD risk scores, when compared to individuals without EVAF, as determined by Wilcoxon two-sample test (A: p=0.0001). This relationship was further reflected by Spearman correlation, which shows that as visceral fat surface area increases, 10-year ASCVD risk percentage tends to increase (B: ρ=0.43, p<0.0001).

- To understand a potential driver behind the relationship between EVAF and cardiovascular risk, Growth Hormone (GH) levels were explored.

Figure 3: Growth hormone levels are inversely correlated with visceral fat area levels in PWH.



Growth hormone levels were significantly lower in PWH with excess visceral fat surface area, when compared to those without EVAF, as determined by Wilcoxon two-sample test (A: p=0.05). A Spearman correlation was performed to determine the associations between visceral abdominal fat levels and GH levels (B). Increasing visceral fat surface area was inversely correlated with GH levels (B: ρ=0.17, p=0.03).

Conclusions

- Excess visceral fat is associated with increased CV risk scores, as well as the traditional risk factors of insulin resistance and lipid levels. These data demonstrate how excess visceral fat contributes to the heightened risk of CVD in PWH on modern ART regimens.
- GH levels are decreased in PWH presenting with EVAF.
- The dynamics between decreased GH levels and EVAF found here support targeting EVAF reduction via the GH axis.

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[1]Feinstein MJ et al, J Am Heart Assoc. 2018; [2]Freiberg MS et al, JAMA Intern Med. 2013; [3]Freiberg MS et al, JAMA Cardiol. 2017; [4]Jerico C et al. Diabetes 2005; [5]Stanley T et al. Growth Horm IGF Res. 2015.