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Bioelectrical Impedance Analysis: Insight into Subclinical Atherosclerosis

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Visceral fat may hasten the atherosclerotic process manifesting as increases in aortic stiffness, which is highly correlated with cardiovascular disease (CVD) risk. Standard tools to measure visceral fat, such as Magnetic Resonance Imaging and Dual-Energy X-Ray Absorptiometry, are expensive and not accessible to all patients, clinicians, and researchers in resource-constrained environments. Visceral fat can also be estimated with bioelectrical impedance analysis (BIA), which is cost-effective and applicable to large-scale observational studies. Whether the visceral fat index from BIA is associated with subclinical CVD risk is unknown. **PURPOSE:** To examine the association of BIA-measured visceral fat index with subclinical CVD risk. **METHODS:** Aortic stiffness was used as a measure of subclinical CVD risk and measured as carotid-femoral pulse wave velocity (cfPWV) in 71 adults (49 females, mean age 21 ± 3 years; body mass index [BMI] of 25 ± 3 kg/m^2). A BIA scale was used to assess visceral fat index by measuring impedance at different frequencies (eg 5 kHz and 200 kHz) and then applying predictive equations. Systemic body fat was assessed using air-displacement plethysmography. The association between BIA visceral fat index and cfPWV were compared using blockwise linear regression. Covariates included age, sex, race/ethnicity, mean arterial pressure, body fat percentage, and BMI. **RESULTS:** BIA visceral fat index was significantly associated with cfPWV (r = 0.51, p = 0.001). Associations remained after fully adjusting for aforementioned covariates (standardized Beta = 0.72, p = 0.006). Aforementioned covariates explained 23.5% of the variance in cfPWV (sig. F change = 0.001) with BIA visceral fat index explaining an additional 8% of the variance in cfPWV (sig. F change = 0.006). Results were similar in a model that replaced air displacement plethysmography body fat percentage with BIA body fat percentage (standardized Beta = 0.81, p = 0.008, R-squared change = 0.07). **CONCLUSION:** BIA visceral fat index was associated with aortic stiffness independent of several confounders including BMI and other measures of systemic body fat. Visceral fat index from BIA may be a safe and cost-effective means to provide insight into subclinical CVD risk.

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