EVALUATION OF RACIAL DIFFERENCES IN RESTING AND POSTPRANDIAL ENDOTHELIAL FUNCTION IN POSTMENOPAUSAL WOMEN MATCHED FOR AGE, FITNESS AND BODY COMPOSITION

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Objective: We investigated endothelial function at rest and after a high-fat meal challenge in African American (AA) and Caucasian postmenopausal women matched for age, body mass index, percent fat and fitness level.

Design: Pilot study.

Setting: University of Virginia General Clinical Research Center. Participants: Eight AA and 8 Caucasian postmenopausal women.

Intervention: Participants underwent a VO2 peak treadmill protocol, percent fat assessment, and brachial artery flow-mediated dilation measurements (baseline and 4 hours following a high-fat meal).

Main outcomes measures: Baseline and postprandial flow mediated dilation (FMD) following a high-fat meal.

Results: FMD values were similar in AA (5.4%, 95% CI: 3.3, 7.4) and Caucasian women (4.0%, 95% CI: 2.0, 6.1). There was no significant change in FMD from baseline to four hours following the meal challenge within groups (AA: .9%, P=.397; Caucasian: .2%, P=.063) or between groups (P= .449), despite a significant increase in triglycerides (AA: 81.8 mg/dL, P < .001; Caucasian: 99.7 mg/dL, P = .004).

Conclusions: The present pilot study found that when postmenopausal AA and Caucasian women are matched for age, fitness and body composition, reported racial differences in resting endothelial function were not observed. Additionally, there were no racial differences in postprandial endothelial function or metabolism following a high-fat meal. (Ethn Dis. 2013; 23[1]:43–48)

Key Words: Flow-mediated Dilation, Postmenopausal, Racial Differences, African American, Postprandial, Endothelial Function

INTRODUCTION

Endothelial dysfunction is believed to be an early event in atherosclerosis, and is an independent risk factor for cardiovascular events1 and hypertension2 in postmenopausal women. Similar to the epidemiological data showing racial differences in cardiovascular risk, endothelial function is reduced in African American (AA) compared to Caucasian women.3 This risk is exacerbated by the deleterious cardiometabolic consequences of menopause4 and aging,5 both of which have been shown to further reduce endothelial function. This is likely due to the increased presence of cardiovascular disease (CVD) risk factors,6 aging related changes in the artery itself,7 reduced physical activity/exercise participation,8 and the decline in endogenous estrogen levels following menopause.5 Loehr et al3 found that AA postmenopausal women had lower (−.54%) flow mediated dilation (FMD) values compared to Caucasians. Based on data from a recent meta-analysis,9 this racial difference in FMD corresponds to approximately a 7% increased risk in CVD in AA women. However, it is possible that this difference could be confounded by aerobic fitness and obesity, as they have not been measured in previous studies finding racial differences in endothelial function.3,10–15 This may be an important consideration as exercise capacity is a strong predictor of mortality.14

Since AA individuals exhibit greater oxidative stress in response to postprandial lipemia compared to Caucasians,19 it is plausible that following a high-fat meal, AA could have greater reduction in endothelial function. However, there are no data to our knowledge whether racial differences are present in postprandial endothelial function specifically following a high-fat meal challenge.

References