

Racial Differences in Vascular Function in Response to Mental Stress

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ABSTRACT

African Americans (AA) have a higher prevalence of hypertension and other cardiovascular (CV) complications compared to other populations. While the reasons for this elevated CV disease risk are multifactorial, vascular dysfunction is a key contributing factor. It has been previously shown that mental stress, induced by mental arithmetic, results in a significant increase in forearm blood flow (FBF). This response has been predominantly attributed to the release and vasodilatory effect of Nitric Oxide (NO). In this regard, a previous study has reported that AA have an attenuated increase in FBF as compared to Caucasians (CA) in response to mental stress, which may be related to impaired vascular function and thus elevated CV disease risk in AA. However, this study was conducted in a middle-age cohort (mid to late 40's). Whether this attenuation is present in a young relatively healthy population is unknown.

PURPOSE: The purpose of this study was to test the hypothesis that the vasodilatory response to mental stress is blunted in a relatively young and healthy AA population. **METHODS:** 6 relatively healthy young AA and 6 CA males (AA age: 22 ± 2.6 , CA age: 23 ± 4.6) participated in this study. All measurements were obtained in the morning following an overnight fast. Brachial artery diameter and blood velocity were assessed using high resolution duplex ultrasound. Mental stress was induced by asking subjects to subtract 7 continuously from a 3-digit number while attempting to report answers at a pace set by a 60 bpm metronome. The 3-digit number was changed at 20 second intervals. FBF was measured during a two minute baseline followed by 3 minutes of mental stress. Vascular function was assessed as the absolute peak blood flow response (ml/min) as well as peak conductance (ml/min/mmHg) during the mental stress. **RESULTS:** The absolute peak flow (AA: 183 ± 39 ml/min, CA: 307 ± 127 ml/min; $P = 0.05$) were significantly greater in CA compared to AA. The maximum increase in conductance (AA: 2.03 ± 0.32 ml/min/mmHg, CA: 3.69 ± 1.39 ml/min/mmHg; $P = .02$) was also significantly higher in CA as compared to AA. **CONCLUSION:** This preliminary data supports our hypothesis that vascular function in response to mental stress is attenuated in young healthy AA as compared to their CA counterparts.