TACSM Abstract

Evidence of Racial Differences in Microvascular Function Among College-Aged Women

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ABSTRACT

Microvascular dysfunction contributes to the development of hypertension and insulin resistance. The black population is at an elevated risk of both conditions relative to other racial groups. Previous studies indicate that college-aged black men, compared to their white counterparts, have impaired microvascular function as assessed by post-occlusion reactive hyperemia (RH). It is unknown whether this racial disparity is present in healthy, young adult black (BW) and white women (WW). Furthermore, whether nitric oxide-mediated cutaneous microvascular hyperemia during local heating (LH) is different in these populations has not been determined. **Purpose:** The purpose of this study was to test the hypothesis that college-aged BW exhibit blunted RH and attenuated LH induced cutaneous hyperemia compared to age-matched WW. **Methods:** College-aged BW (n=7) and WW (n=7) were studied during the early follicular phase of the menstrual cycle. For RH, brachial artery diameter and blood velocity were measured via Doppler ultrasound before and after 5 min of forearm occlusion. For LH, a microdialysis membrane was inserted in the dermis of the forearm and perfused with Ringer's solution. Red blood cell flux was assessed with laser Doppler after ~40 min of continuous 39^{o}C LH. Maximal flux was established with 28 mM sodium nitroprusside infusion and 43^{o}C LH. Brachial BP was measured throughout and cutaneous vascular conductance (CVC) was calculated as flux / MAP and reported as % of max CVC. **Results:** WW and BW were matched for age (21 ± 3 vs 20 ± 1 y, P = 0.58) and BMI (23 ± 2 vs 23 ± 3 kg/m^2, P = 0.94). There were no differences between WW and BW in baseline blood velocity (23.1 ± 5.7 vs 24.4 ± 11.6 cm/s, P = 0.79) or blood flow (98.9 ± 38.3 vs 114.5 ± 80.7 ml/min, P = 0.65). WW and BW also had similar peak blood velocity (109.2 ± 13.8 vs 109.7 ± 28 cm/s, P = 0.97), peak blood flow (453.7 ± 164.7 vs 482.5 ± 187.7 ml/min, P = 0.77), and total blood flow AUC during the 120 s after cuff release (487.4 ± 178.5 vs 486.8 ± 190.1 ml, P = 0.99). However, compared to WW, BW had a significantly blunted CVC during 39^{o}C LH (66 ± 17 vs 45 ± 10 %max, P = 0.02). **Conclusions:** BW had blunted blood flow responses to LH compared to WW despite similar blood velocity and flow responses during RH. This suggests that LH is more sensitive than RH to early impairments in microvascular function.