

Central Blood Pressure and Peripheral Reactive Vasodilation in Plant-Based and Typical Dieting African Americans

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ABSTRACT

African American individuals (AA) face higher mortality rates from cardiovascular disease than Americans from other racial/ethnic backgrounds. The cause of this health disparity is multifactorial and is in part related to impaired vascular function as well as other variables including diet and numerous socioeconomic factors. Diets rich in whole plant foods and low in animal products may protect blood vessels through their high antioxidant capacity and low inflammatory load. **PURPOSE:** The purpose of this study was to test the hypothesis that AA adhering to a 100% plant-based (vegan) diet (PBD) would have a more favorable dietary intake of several key nutrients and more optimal blood cholesterol, which would contribute to better blood pressure and peripheral reactive vasodilation relative to AA following a typical American diet (TAD). **METHODS:** Seventeen AA participated in the study. Of them, 8 (5 female; age: 25±2 years; BMI: 23.4±1.4 kg/m²) were following a PBD for 2.5±0.3 years and 9 (5 female; age: 21±1 years; BMI: 25.3±2.1 kg/m²) were following a TAD. A fasting venous blood draw was performed to assess blood lipids. Participants completed a comprehensive diet questionnaire (DHQIII, NIH). Peripheral and central blood pressures were measured via the SphygmoCor system (AtCor Medical). Brachial artery flow-mediated dilation (FMD) and reactive hyperemia (RH) were assessed via well-established procedures. Briefly, 2 min baseline measurements of brachial artery diameter and blood velocity were taken via Doppler ultrasound before a forearm cuff was inflated to 220 mmHg for 5 min. Post-occlusion data were recorded for 3 min. Measurement of baseline to peak post-occlusion brachial artery diameter and blood velocity were performed by pairing a video capture system (Elgato) with edge-detection and blood velocity-tracking software (Quipu). **RESULTS:** PBD AA consumed more dark green vegetables and whole grains and less cholesterol than TAD AA ($p < .05$ for all). Consumption of sodium, potassium, and vitamins C & E was not different between groups ($p > .05$ for all). Total (TC) and low-density lipoprotein (LDL-C) blood cholesterol concentrations were lower in PBD AA relative to TAD AA (TC: 136±9 vs. 174±12 mg/dl; LDL-C: 77±6 vs. 106±11 mg/dl; respectively; $p < .05$ for both). Resting brachial (b) and central (c) mean arterial blood pressures (MAP) were lower in PBD AA relative to TAD AA (bMAP: 85±2 vs. 91±2 mmHg; cMAP: 80±2 vs. 87±2 mmHg; respectively; $p < .05$ for both). There were no differences between groups in FMD nor RH ($p > .05$ for all). FMD and FMD/shear rate were 7.7±0.8% and 0.33±0.05 au in PBD AA and 6.2±0.9% and 0.27±0.03 au in TAD AA, respectively. For RH, the percentage change in blood velocity and flow were 144±479% and 1425±466% in PBD AA and 707±495% and 671±76% in TAD AA, respectively. **CONCLUSION:** These preliminary data suggest that a diet rich in whole plant foods but devoid of animal products may be associated with healthier blood cholesterol and peripheral and central blood pressures in AA but that these differences may not yet be translating to differences in peripheral reactive vasodilation.