

Similarities in Vasoconstrictor Responsiveness to Exogenous Norepinephrine in the Cutaneous Circulation Between Young Black and White Men

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ABSTRACT

Black (BL) men have an increased risk of hypertension and CVD compared to white (WH) men which is partially related to vascular dysfunction. In particular, elevated vascular resistance and increased sympathetic vascular transduction (SVT; greater constrictor and blood pressure responses for a burst of sympathetic nerve activity) may be a contributing factor. Previous reports indicate that BL men have exaggerated responses to a variety of stressors including cold pressor, orthostasis, and exercise; while also exhibiting increased SVT at rest. Additionally, rodent models indicate that oxidative stress contributes to heightened SVT. For example, hypertensive rats have elevated SVT which is attenuated following ascorbic acid (AA) administration such that the responses are similar to normotensive control rats. Additionally, administration of L-NAME; a nitric oxide synthase (NOS) inhibitor augments the constrictor response in healthy rats to the level of the hypertensive rats. These data suggest that oxidative stress and nitric oxide (NO) bioavailability may play a critical role in the heightened SVT in BL men. **PURPOSE:** To test the hypothesis that, BL men exhibit greater vasoconstrictor response to norepinephrine (NE; non-selective α -adrenoreceptor agonist) relative to WH men and exhibit a reduction in response with the administration of AA. **METHODS:** Four intradermal microdialysis membranes were inserted into the left forearm of 7 BL men and 6 WH men (mean \pm SD; age: 22 ± 2 vs. 25 ± 4 , respectively). Following 60-min of trauma resolution, each site was infused at a rate of $2\mu\text{L}/\text{min}$ with either lactated Ringer's (control), AA (10mM), L-NAME (20mM) and a combination of AA+L-NAME (10mM and 20mM) for 30-min. After, local heaters were turned on to 33°C for 10-min to reach a baseline skin blood flow. NE (100mM) was then co-administered at each site for 6-min. The response is presented as a percent reduction in cutaneous vascular conductance (CVC; flux/mean arterial pressure) from baseline (%CVC_B). **RESULTS:** Following the administration of NE, BL and WH men exhibited a similar magnitude of vasoconstriction at all sites (control: -81.7 ± 8.2 vs. $-76.8 \pm 14.9\%$ CVC_B, AA: -82.0 ± 27.0 vs. $-54.8 \pm 67.0\%$ CVC_B, L-Name: -65.6 ± 17.1 vs. $-66.7 \pm 23.9\%$ CVC_B, AA +L-NAME: -78.2 ± 7.6 vs. $-64.9 \pm 16.0\%$ CVC_B; $p > 0.05$). **CONCLUSION:** Contrary to our hypothesis, there appears to be no difference in the constrictor response between BL men and WH men and that oxidative stress and NO do not seem to play a role in this response.