

Carotid Baroreflex Responses to Simulated Hypotension are Blunted During Passive Whole-body Heat Stress in Young Women

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ABSTRACT

Previous studies have proposed that carotid baroreflex (CBR) function is potentially compromised during heat stress, thus possibly disrupting the ability to maintain arterial blood pressure in the heat (e.g., decreased orthostatic tolerance during hyperthermia). Recently, we demonstrated that CBR function is preserved, if not enhanced, during a passive whole-body heat stress (WBH) in young healthy men. What remains unknown is how CBR function is impacted by hyperthermia in women. **PURPOSE:** Therefore, the purpose of this study was to test the hypothesis that CBR-mediated responses are preserved during a passive WBH in young women. **METHODS:** Changes in mean arterial pressure (MAP) and HR were assessed in 7 healthy women (age: 21±1 yrs, height: 171±5 cm, weight: 66±5 kg, BMI: 23±2 kg/m²) using 5-s trials of neck pressure (NP, carotid hypotension) and neck suction (NS, carotid hypertension) ranging from +40 to -80 Torr during normothermia (NT) and WBH (increased core temp ~1.0 °C) conditions. To assess the CBR control of MAP and HR, a separate two-way repeated measures ANOVA was utilized for 1) hypertensive stimuli (i.e., NS: -20, -40, -60 & -80 Torr) and 2) hypotensive-stimuli (i.e., NP: +20 & +40 Torr). Additionally, the time-to-peak responses for HR and MAP, separately, in response +40 Torr & -80 Torr trials were examined between thermal conditions using paired t-tests. **RESULTS:** During WBH, the CBR-mediated increases in MAP and HR in response to NP were blunted (main effect of thermal condition p=0.02 and p=0.02, respectively). While the CBR-mediated decreases in MAP in response to NS were not different between thermal conditions (main effect of thermal condition p=0.34), decreases in HR were markedly greater during WBH (main effect of thermal condition p<0.001). Additionally, the time-to-peak responses for MAP and HR were not altered between thermal conditions for either NP or NS trials (p > 0.05 for all comparisons). **CONCLUSION:** Taken together, these data suggest the CBR control of MAP and HR during simulated hypotension is blunted in females during passive WBH, while the control of MAP and HR seems to be preserved, if not enhanced, during simulated hypertension. Contrary to our findings in young men, these results suggest there are sex differences in CBR function during WBH. This diminished ability to increase MAP and HR in response to a hypotensive stimulus during hyperthermia may be a key component in reduced orthostatic tolerance in females during WBH.