TACSM Abstract

The Acute Effect of Heat Therapy on Conduit Artery and Forearm Microvascular Function

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ABSTRACT

Heat Therapy (HT) is a practice that has been widely adopted across many cultures for centuries due to its multitude of health-related benefits. In terms of cardiovascular related benefits, HT improves various physiological indices including peripheral vascular function thereby mitigating the decline of arterial health. While studies investigating the effect of heat-therapy on mechanisms of vascular function are becoming more common, the vast majority are conducted following chronic exposure to the heat perturbation (i.e., multiple exposures a week for 2 – 3 months) as opposed to the effect of exposure to an acute bout of HT (i.e., single exposure). Furthermore, the impact of HT on cardiovascular health specifically in females is also understudied. **PURPOSE**: To test the hypothesis that peripheral macro and microvascular function would be augmented in a cohort of healthy college-aged females following an acute bout of HT. **METHODS:** Eight young females (23 ± 4 years, BMI: 27±4 kgm^{-2}) participated in this preliminary study. Participants ingested a telemetry pill for the measurement of intestinal temperature (HQ, CorTemp) and were fitted with a water-perfused, tube-lined suit (Med-Eng) that covered the entire body except for the head, forearms, hands, and feet. Heart rate (ECG) and blood pressure (SunTech) were measured throughout the protocol. Vascular testing was conducted before (Normothermia (NT)) and 45 minutes following a 1 hr period of heat stress (HS) accomplished by circulating 49 °C water through the suit (Post-HS). To assess peripheral vascular function, brachial artery diameter and blood velocity (duplex Doppler ultrasound) were recorded during a 2 min baseline, after which a cuff placed 3 cm distal to the elbow was inflated to 220 mmHg for 5 min and then rapidly deflated. Post-occlusion data was collected for an additional 3 min. Peripheral macrovascular function was assessed as the magnitude of change in brachial artery diameter following cuff release (flow mediated dilation (FMD)) as well as FMD corrected for shear stress rate (FMD/SR). Peripheral microvascular function was assessed as peak blood velocity following cuff release. **RESULTS:** HS significantly increased core temperature (Δ1.0±0.2 °C; $p<0.001$ vs. NT**)**, which returned to the NT value during the post-HS measurement (Δ0.09±0.2 °C; $p=0.30$ vs. NT). Macrovascular function assessed as relative FMD (NT: 5.3±3.1%; post-HS: 7.4±3.6%, $p=0.09$) and FMD/SR (NT: 0.21±0.15 a.u.; post-HS: 0.29±1.3 a.u., $p=0.15$) was similar between both measurement time points. Likewise, microvascular function assessed as the peak blood velocity achieved following cuff release was similar between measurement time points (NT: 88±25 cm • s^{-1} ; post-HS: 97±30 cm • s^{-1} , $p=0.20$). **CONCLUSION:** These preliminary findings suggest that one session of whole-body heat therapy may not impact peripheral macro or microvascular function