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The Impact of the Cold Pressor Test on Inter-arm Differences in Blood Pressure

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The presence of a large inter-arm difference (IAD+; ≥ 10 mmHg between arms at rest) in blood pressure (BP) at rest has been established as an early indicator of cardiovascular risk. As potential mechanisms for IAD at rest or during exercise are not well understood, unique physiological stimuli may provide useful insight towards better understanding for potential diagnostic and/or therapeutic interventions. It is well known that the cold pressor test (CPT) has a potent effect on BP and acts primarily through the sympathetic nervous system (SNS), specifically nociceptors. To date, the effects of SNS stimulation on IAD are not known. **PURPOSE:** To examine the effects of the CPT on IAD. **METHODS:** On an initial visit, participants were measured for anthropometrics and provided with pre-test instructions for a follow-up visit (i.e., 4h fast, 24h abstinence from exercise, caffeine, alcohol). On the second visit, BP was monitored simultaneously using two, automated, auscultatory monitors. Participants randomly completed two CPT tests (left and right hand), with each test including a 15-minute rest, three pre-test BP measurements (averaged), a three-minute water immersion (3°C; BP at :30s and 2:00), and a 10-minute passive recovery period. Descriptive statistics were calculated, and a repeated measures ANOVA test was used to compare the relative IAD response to the CPT between IAD+ and IAD- (<10mmHg IAD at rest) individuals at rest. **RESULTS:** An overall difference in the CPT response was noted between IAD- and IAD+ individuals ($P < 0.05$), though pairwise comparisons yielded no specific differences. Observationally, a great deal of variance was noted in the percentage change in IAD (%) in the IAD- cohort, while the IAD+ response had very little variance. **CONCLUSION:** The CPT revealed a similar response in IAD as previously documented stimuli, specifically a greater increase in systolic IAD across arms in IAD- individuals. IAD+ individuals had a blunted response to the CPT, possibly indicating that suggested anatomical bases, and physiological responses derived by sympathetic means, deserve further investigation as potential mechanisms behind resting and exercise IAD.