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Sex Differences in Augmentation Index in Response to Acute Dynamic Exercise

Ibukun Lawal¹, Dakota T. Siok¹, Nicholas Reveille¹, Alexander Laurel¹, Ian Imery², Hannah Zabriskie¹, Devon A. Dobrosielski¹, Kathleen Dondero¹, Odessa Addison^{3,4}, Rian Q. Landers-Ramos¹
¹Towson University, Towson, MD, ²Johns Hopkins University, Baltimore, MD, ³University of Maryland School of Medicine, Baltimore, MD, ⁴Baltimore Veterans Affairs Geriatric Research, Education and Clinical Center, Baltimore, MD

Augmentation index (AIx) is derived from pressures imposed on the left ventricle as a result of systolic peripheral wave reflection. Differences in AIx in response to an acute stress, such as exercise, may prove useful for predicting future cardiovascular risk in younger adults, but less is known about whether this response differs between men and women. **PURPOSE:** To examine whether there are sex differences in AIx in response to an acute bout of exercise in healthy individuals. **METHODS:** Apparently healthy recreationally active individuals (18-42 yrs old; 10 men and 11 women) arrived at the lab 12 hrs fasted. Baseline measurements for AIx were taken using cuff-based applanation tonometry on the dominant arm. Participants underwent four rounds of dynamic body weight exercises. AIx measures were repeated at 5-, 10-, and 15-minutes post exercise and again 24-hrs post exercise. All AIx values were normalized to a heart rate of 75 bpm (AIx75). **RESULTS:** AIx75 was significantly higher in women ($5.9 \pm 3.6\%$) compared to men ($-3.9 \pm 2.6\%$) at baseline ($P=0.04$). Compared to baseline there was a significant increase in AIx75 in men ($13.6 \pm 3\%$; $P<0.001$) and women ($26.2 \pm 3.9\%$; $P<0.001$) 5-min post exercise with women exhibiting a significantly greater response ($P=0.02$). Compared to values at 5-min post exercise, there was a significant drop in AIx75 at both 10-min ($18.6 \pm 3.6\%$; $P<0.001$) and 15-min ($15 \pm 3.6\%$; $P<0.001$) post-exercise in women. However, AIx75 remained elevated in men at both 10-min ($16 \pm 3.4\%$; $P=0.33$) and 15-min post exercise ($12 \pm 3.2\%$; $P=0.1$). Differences between sexes were not evident at either 10- or 15-min post exercise ($P=0.58$ and $P=0.51$, respectively). AIx75 returned to baseline levels at the 24-hr visit ($P=0.57$ for both men and women) and resting sex differences were again apparent ($-5.5 \pm 3.5\%$ in men vs. $7.2 \pm 3.5\%$ in women; $P=0.01$). **CONCLUSIONS:** This study demonstrates sex differences in resting and post-exercise induced increases in AIx75. These findings suggest potential physiological or structural differences in women that are influencing arterial and left ventricular pressures at rest and in response to exercise.