

## Sex differences in The Hemodynamic Response to arm elevation

<sup>1</sup>Kasprowicz, A., <sup>1</sup>Tarzia, B., <sup>2</sup>Davies, J., <sup>3</sup>Casey, D., <sup>1</sup>Heffernan, K., <sup>1</sup>Syracuse University, Syracuse, NY,

<sup>2</sup>St Mary's Hospital, London, UK, <sup>3</sup>Mayo Clinic, Rochester, MN

[agkaspro@syr.edu](mailto:agkaspro@syr.edu), [bjtarzia@syr.edu](mailto:bjtarzia@syr.edu), [justindavies@imperial.ac.uk](mailto:justindavies@imperial.ac.uk), [Casey.Darren@mayo.edu](mailto:Casey.Darren@mayo.edu), [ksheffer@syr.edu](mailto:ksheffer@syr.edu)

The force of gravity affects blood pressure (BP) by influencing intravascular pressure gradients. Men and women have a different BP response to challenges that alter pressure gradients such as orthostatic challenge. **Purpose:** We examined the peripheral hemodynamic response to arm elevation as a means of studying potential sex differences in gravity-induced changes in BP. **Methods:** Radial artery waveforms were obtained using applanation tonometry in 20 men (age  $27\pm 2$  yrs, BMI  $25\pm 1$  kg/m<sup>2</sup>) and 20 women (age  $27\pm 2$  yrs, BMI  $23\pm 1$  kg/m<sup>2</sup>). Arm position was maintained at either heart level or supported 14 cm above heart level in a randomized fashion. Amplitude of the late systolic shoulder (P2) of the radial BP wave was used as a measure of pressure attributable to wave reflections. A reservoir-wave separation technique was used to obtain the arterial reservoir pressure (pressure generated by arterial capacitance discharge). **Results:** Women showed a significant reduction in diastolic blood pressure (DBP) ( $69\pm 2$  to  $66\pm 1$  mmHg;  $p<0.05$ ) and reservoir pressure ( $16.8\pm 1.2$  to  $14.2\pm 1.2$  mmHg;  $p<0.05$ ), with no change in P2 ( $26.9\pm 1.3$  to  $26.0\pm 1.4$  mmHg;  $p>0.05$ ) during arm elevation. Conversely, men showed no change in DBP ( $70\pm 2$  to  $69\pm 1$  mmHg,  $p>0.05$ ) while showing a significant increase in reservoir pressure ( $11.9\pm 1.3$  to  $14.5\pm 1.2$  mmHg;  $p<0.05$ ) and P2 ( $25.3\pm 1.3$  to  $28.7\pm 1.4$  mmHg,  $p<0.05$ ) during arm elevation. **Conclusion:** Gender differences exist in the hemodynamic response to gravity-induced changes in regional BP. In response to arm elevation, men maintain DBP possibly via increased pressure from wave reflections and reservoir pressure. Women experience a drop in DBP and this may be due to reductions in reservoir pressure coupled with inability to increase pressure from wave reflections.

Funding provided by the Burstyn Endowed Fund for Collaborative Research in Education at Syracuse University