TACSM Abstract

Sex, But Not Spontaneous Cardiovagal Baroreflex Sensitivity, Predicts Tolerance To Simulated Hemorrhage

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ABSTRACT

Some, but not all studies, suggest that spontaneous cardiovagal baroreflex sensitivity (cBRS; i.e., autonomic control of heart rate) is lower in females. However, it is unknown whether cBRS values are associated with hemorrhagic tolerance, which has repeatedly been demonstrated to be lower in females. **PURPOSE:** Therefore, the purpose of this study was to test the hypothesis that resting spontaneous cBRS is lower in females and that cBRS is associated with differences in hemorrhagic tolerance between the sexes. **METHODS:** 25 females (age: 26 ± 6 years) and 27 males (age: 30 ± 5 years) completed a progressive lower-body negative pressure (LBNP – a simulation of hemorrhage) protocol starting at -40 mmHg, which was reduced by 10 mmHg every 3 minutes until presyncope. Presyncope was defined by the subject feeling faint and/or nauseous; a rapid decline in blood pressure (BP) < systolic BP of 80 mmHg; and/or a relative bradycardia accompanied by narrowing of pulse pressure. LBNP tolerance was quantified as cumulative stress index (CSI; mmHg*min). Heart rate (HR) and beat-to-beat BP (finometer) were measured continuously. Spontaneous cBRS was analyzed using the sequence method (i.e., ≥ 3 consecutive cardiac cycles of concordant changes in R-R interval and systolic BP, $r2 \geq 0.8$ for such sequences). Data were compared between sexes using a Mann-Whitney U test. A least squares multiple linear regression was used to compare the effect of sex and cBRS on CSI. Data are presented as median ± IQR. **RESULTS:** Resting BP and HR were not different between the sexes ($p > 0.36$ for both). Resting cBRS was not different between females and males (21 ± 16 vs. 22 ± 11 ms/mmHg, respectively, $p = 0.73$). As expected, females had a lower tolerance to LBNP (Females: 385 ± 322, Males: 918 ± 418 mmHg*min, $p < 0.0001$). Multiple linear regression analysis revealed a significant effect of sex ($\beta = 408$, $p= 0.04$), but not resting cBRS ($\beta = 2.4$, $p = 0.69$) or sex*cBRS (i.e., interaction; $\beta = 1.32$, $p = 0.87$), on CSI. When data from both sexes were combined, there was no correlation between resting cBRS and CSI ($r = 0.05$, $p = 0.71$). **CONCLUSION:** Our cohort did not exhibit sex-related differences in resting cBRS. As expected, females had a lower tolerance to simulated hemorrhage. Importantly, we demonstrated that resting cBRS does not explain the observed sex differences in hemorrhagic tolerance.