PO-24: SEX DIFFERENCES IN HEMODYNAMIC RESPONSES FOLLOWING ACUTE INFLAMMATION: WAVE SEPARATION ANALYSIS

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Abstracts

PO-23
DEPENDENCY OF ARTERIAL STIFFNESS INDICATORS ON ACUTE BLOOD VOLUME CHANGES
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Increased arterial stiffness is associated with greater risk for cardiovascular disease. It is unknown if indicators of stiffness are dependent on acute changes in cardiovascular conditions (such as altered central blood volume). Objectives: To examine if arterial stiffness indicators change with acute reductions in stroke volume (SV) within normal physiological variability.

Methods: Seven young healthy volunteers (4M, 3F) were recruited to participate in this study. To acutely alter blood volume, subjects were sealed from their waist down into a lower body negative pressure (LBNP) box and a vacuum was used to create a pressure gradient of 30mmHg. Heart rate (HR) was continuously monitored and SV was obtained with Doppler ultrasound. Aortic and femoral artery velocity profiles were obtained with Doppler ultrasound to determine central pulse wave transit time (cPWTT), cPWTT was calculated by subtracting the time between the peak of the R-wave and the foot of the aortic velocity profile from the time between the peak of the R-wave and the foot of the femoral velocity profile. Common carotid distensibility (cDa) was determined with simultaneous tonometry to determine pulse pressure (PPP) and ultrasound imaging to determine diastolic and systolic diameters (cDa – systolic area – diastolic area / PPP – carotid distal area).

Results: The increase in HR from baseline to LBNP was not significant while SV was significantly lower at LBNP (45±13ml/beat) compared to baseline (69±11ml/beat; p=0.002). PPP was lower at LBNP (43±6mmHg) compared to baseline (48±5mmHg; p=0.007). While cDa was significantly decreased (Baseline = 0.00732±0.00186mmHg⁻¹ vs. LBNP = 0.00592±0.00219mmHg⁻¹; p=0.033), cPWTT tended to get faster with LBNP (baseline = 95±17sec vs. LBNP = 87±13sec; p=0.089).

Conclusions: The arterial stiffness indicators, cDa and cPWTT, might be affected by acute changes in central blood volume and cardiac SV within normal physiological variations.

PO-24
SEX DIFFERENCES IN HEMODYNAMIC RESPONSES FOLLOWING ACUTE INFLAMMATION: WAVE SEPARATION ANALYSIS
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Acute inflammation temporarily increases risk of cardiovascular events and alters hemodynamics. However, it is unknown whether acute inflammation differentially affects blood pressure and wave pulse characteristics, including forward or reflected pressure waves, in males versus females.

Objectives: The purpose of this study was to investigate the potential sex differences in the response to acute inflammation in blood pressure and wave pulse characteristics, measured with wave separation analysis.

Methods: 63 adults (29 males, 34 females) participated in the study. Participants received an influenza vaccine to induce acute inflammation. Central blood pressure and pulse waves were measured using tonometry and separated into forward and reflected waves, at baseline, 24hr post, and 48 hr post-vaccination. 2 x 3 repeated measure Analysis of Variance (ANOVA) was performed to investigate sex differences in acute inflammation.

PO-24. Table 1

<table>
<thead>
<tr>
<th>Gender</th>
<th>Brachial DBP(mmHg)</th>
<th>Aortic DBP(mmHg)</th>
<th>Aortic MAP(mmHg)</th>
<th>Forward wave pressure(mmHg)</th>
<th>Reflected wave pressure(mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline 24 hr Post</td>
<td>48 hr Post</td>
<td>Baseline 24 hr Post</td>
<td>48 hr Post</td>
<td>Baseline 24 hr Post</td>
</tr>
<tr>
<td>Male</td>
<td>69±1.9  67±1.9  69±1.9  70±1.9</td>
<td>68±1.9  69±1.9  87±1.0</td>
<td>84±1.9  85±1.0</td>
<td>29±1.5</td>
<td>29±1.5</td>
</tr>
<tr>
<td>Female</td>
<td>66±1.8  63±1.7  64±1.7  66±1.8</td>
<td>64±1.7  64±1.7  82±1.1</td>
<td>79±1.8  79±1.9</td>
<td>27±1.5</td>
<td>27±1.5</td>
</tr>
</tbody>
</table>

* Different from other time point, p<0.05.
† Sex difference. Significant at p<0.05.
Results: There were significant sex differences in brachial SBP, brachial DBP, aortic DBP and aortic MAP with higher values in males (p<0.05). However, there were no statistically significant sex differences in wave separation variables or aortic SBP during acute inflammation, but acute inflammation decrease brachial DBP, aortic SBP, and aortic MAP in all subjects combined, and reflected pulse pressure approached a decline in the entire cohort (p=0.06).

Conclusions: The results suggest that blood pressure, forward and reflected pulse wave pressure exhibited similar responses in males and females during acute inflammation.

PO-25
LEFT VENTRICULAR END-SYSTOLIC ELASTANCE (ECAVI) ESTIMATED WITH CAVI
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Objective: Left ventricular end-systolic elastance (Ecavi) was estimated using the parameters measured for calculating cardio-ankle vascular index (CAVI).

Methods: Participants comprised 4,954 healthy individuals (2,679 males, 2,275 females) who visited the health examination center at Fukui-ken Saiseikai Hospital between July 2007 and November 2013. Left ventricular-arterial coupling (Ees/Ea) was obtained from end-systolic arterial pressure (Pes), end-diastolic arterial pressure (Pd), pre-ejection period (PEP) and ejection time (ET), all of which were obtained as parameters measured on a vascular screening system (VaSera VS-1500N; Fukuda Denshi, Tokyo, Japan) based on the non-invasive method described by Hayashi et al. Mean arterial pressure (Pm) was assumed to be equal to Pes for the calculation of Ees/Ea(2)

Results: The population showed the same results as the healthy group recruited in the user's manual of the vascular screening system (Fig. 1); namely, normal range of CAVI was between 6.3 and 8.7, CAVI was higher in males than in females, and CAVI was slightly increased in the high aged group. Ecavi was estimated with CAVI was defined as CAVI / Ees/Ea.

Conclusions: The original left ventricular end-systolic elastance (Ees) could be estimated as Ecavi, representing CAVI / Ees/Ea, using a non-invasive vascular screening system.

References:

Figure. 2 Average of Ecavi in Healthy Group.