P74: WALL SHEAR RATE AND BRACHIAL ARTERY FLOW-MEDIATED DILATORY RESPONSE BETWEEN HEALTHY YOUNG AND OLDER POPULATIONS USING MULTI-GATE SPECTRAL DOPPLER ULTRASOUND

Kunihiko Aizawa, Sara Sbragi, Alessandro Ramalli, Piero Tortoli, Francesco Casanova, Carmela Morizzo, Clare Thorn, Angela Shore, Phillip Gates, Carlo Palombo

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ASSOCIATION BETWEEN URINARY SODIUM EXCRETION, ENDOTHELIAL FUNCTION AND ARTERIAL STIFFNESS IN NON-DIABETIC HYPERTENSIVE PATIENTS
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Background: High salt intake has been associated with structural and functional vascular changes.1
Objective: To correlate urinary sodium excretion with endothelial function and arterial stiffness in non-diabetic hypertensive patients.
Methods: Cross-sectional study with non-diabetic hypertensive patients, both genders, aged 45–65 years, submitted to office blood pressure measurement, 24-hour urine sampling, carotid-femoral pulse wave velocity (PWV; Compior Analysis), central hemodynamic parameters by applanation tonometry (SphygomCor) and microvascular reactivity by Laser Speckle Contrast Analysis (Pericam PSI)2.
Results: Patients (n = 18) were divided according to the urinary sodium excretion (UnNa) median: group 1 (UnNa <165mEq/24h) and group 2 (UnNa ≥165mEq/24h). The mean age was 56 years, 72% were women. Although not statistically significant, group 2 presented greater systolic blood pressure (SBP, 136 ± 12 vs 144 ± 20 mmHg, p = 0.382) and diastolic blood pressure (84 ± 10 vs 87 ± 10 mmHg, p = 0.523), Serum insulin (11 ± 5 vs 20 ± 12 mcU/ml, p = 0.072), HOMA-IR (2.6 ± 1.2 vs 4.9 ± 3.0, p = 0.069), C-Reactive protein (CRP, 0.12 ± 0.35 vs 0.78 ± 0.83 mg/dL, p = 0.05) and PWV (23 ± 2.1 vs 10.8 ± 2.3 m/s, p = 0.023) were also higher in group 2. There were no significant differences in aortic SBP (127 ± 16 vs 132 ± 20 mmHg, p = 0.556), and in the peak of microvascular reactivity (95.5 ± 24.0 vs 83.4 ± 45.1, p = 0.505). Group 2 presented a higher proportion of patients with HOMA-IR greater than 2.7 (37.5 vs 70.0%, p = 0.034), CRP greater than 0.4 mg/dl (12.5 vs 55.6%, p = 0.064) and PWV greater than 10m/s (25 vs 80%, p = 0.020).
Conclusion: Although without significant differences in blood pressure and endothelial function, hypertensive patients with higher urinary sodium excretion showed changes suggestive of insulin resistance and arterial stiffness.
References

Poster Session 1 – Imaging Technologies
P73
THE ASSESSMENT OF PULMONARY ARTERY STIFFNESS IN COPD USING CARDIAC MRI THE Q/A METHOD
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Background: Pulmonary artery distensibility and pulsatility has been studied in patients with COPD using cardiac MRI (CMRI).1
Pulmonary artery distensibility and pulsatility has been studied in patients with COPD using cardiac MRI (CMRI).1
Objective: To assess pulmonary artery stiffness in patients with COPD using cardiac MRI (CMRI)’.2
Methods: This analysis includes 23 COPD and 12 healthy volunteers (current smokers), aged 45–65 years, submitted to office blood pressure measurement, 24-hour urine sampling, carotid-femoral pulse wave velocity (PWV; Compior Analysis), central hemodynamic parameters by applanation tonometry (SphygomCor) and microvascular reactivity by Laser Speckle Contrast Analysis (Pericam PSI)?

Results: Patients (n = 18) were divided according to the urinary sodium excretion (UnNa) median: group 1 (UnNa <165mEq/24h) and group 2 (UnNa ≥165mEq/24h). The mean age was 56 years, 72% were women. Although not statistically significant, group 2 presented greater systolic blood pressure (SBP, 136 ± 12 vs 144 ± 20 mmHg, p = 0.382) and diastolic blood pressure (84 ± 10 vs 87 ± 10 mmHg, p = 0.523), Serum insulin (11 ± 5 vs 20 ± 12 mcU/ml, p = 0.072), HOMA-IR (2.6 ± 1.2 vs 4.9 ± 3.0, p = 0.069), C-Reactive protein (CRP, 0.12 ± 0.35 vs 0.78 ± 0.83 mg/dL, p = 0.05) and PWV (23 ± 2.1 vs 10.8 ± 2.3 m/s, p = 0.023) were also higher in group 2. There were no significant differences in aortic SBP (127 ± 16 vs 132 ± 20 mmHg, p = 0.556), and in the peak of microvascular reactivity (95.5 ± 24.0 vs 83.4 ± 45.1, p = 0.505). Group 2 presented a higher proportion of patients with HOMA-IR greater than 2.7 (37.5 vs 70.0%, p = 0.034), CRP greater than 0.4 mg/dl (12.5 vs 55.6%, p = 0.064) and PWV greater than 10m/s (25 vs 80%, p = 0.020).
Conclusion: Although without significant differences in blood pressure and endothelial function, hypertensive patients with higher urinary sodium excretion showed changes suggestive of insulin resistance and arterial stiffness.
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P74
WALL SHEAR RATE AND BRACHIAL ARTERY FLOW-MEDIATED DILATORY RESPONSE BETWEEN HEALTHY YOUNG AND OLDER POPULATIONS USING MULTI-GATE SPECTRAL DOPPLER ULTRASOUND
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Background: Ageing is associated with an impaired brachial artery flow-mediated dilatation (FMD) response and a reduced wall shear rate (WSR) stimulus may contribute to this response. However, a detailed analysis of the WSR-FMD response is lacking due to inherent difficulties of WSR estimation near the arterial wall by conventional ultrasound. We have overcome this limitation by using an integrated multi-gate Doppler FMD evaluation system, and in this study, we compared the WSR-FMD relationship between a healthy young and older population.
Methods: Data from 33 young (YNG; 27.5 ± 4.9 yrs) and 33 older (OLD; 64.9 ± 3.6yrs) individuals were analysed. FMD was assessed using Ultrasound Advanced Open Platform (ULA-OP). Acquired raw data were post-processed using custom-designed software to obtain WSR and diameter parameters.
Results: Peak WSR ([WSRp] = 635(585–685) vs 424(374–473) s⁻¹) and absolute WSR increase [WSRa] = 548(504–592) vs 356(313–400) s⁻¹) were greater in YNG than OLD (both p < 0.05). WSR area under the curve until its return to baseline value (WSRauc) was also greater in YNG than OLD [18632(16395–20868) vs 13049(10812–15285)] au, p < 0.05). WSRp, WSRa and WSRauc were associated with both absolute and percentage diameter increases in YNG (all p < 0.05). However, none of the WSR parameters in OLD were associated with absolute or percentage diameter increases.
Conclusions: These results demonstrate 1) a reduced WSR stimulus during reactive hyperaemia in OLD compared with YNG, and 2) the absence of an association between WSR parameters and FMD response in OLD. These observations suggest that in older adults, diminished WSR together with WSR-independent factors are important determinants of the FMD response.

Table 1. Data are mean ± SD.

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>Gender (male:female)</th>
<th>BMI kg/m²</th>
<th>Smoking (pack years)</th>
<th>PA-PWV (m/s)</th>
<th>AoPWV (m/s)</th>
<th>MAP (mmHg)</th>
<th>Resting heart rate (bpm)</th>
<th>FEV1/FVC (L)</th>
<th>FEV1 % predicted</th>
<th>6MWD (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.8 ± 7.3</td>
<td>11:12</td>
<td>25.3 ± 3.3</td>
<td>39.0 ± 29.9</td>
<td>3.37 ± 0.6</td>
<td>9.4 ± 2.6</td>
<td>97.2 ± 9.5</td>
<td>68 ± 9</td>
<td>0.55 ± 0.14</td>
<td>35.9 ± 17.6</td>
<td>388.2 ± 127.7</td>
</tr>
<tr>
<td>66.8 ± 7.1</td>
<td>6:6</td>
<td>26.6 ± 3.4</td>
<td>12.2 ± 8.6</td>
<td>1.41 ± 0.4</td>
<td>8.5 ± 1.3</td>
<td>90.5 ± 11.2</td>
<td>62 ± 7</td>
<td>0.75 ± 0.06</td>
<td>105.8 ± 12.5</td>
<td>536.8 ± 49.9</td>
</tr>
</tbody>
</table>

p-value
0.713
0.903
0.351
<0.001
<0.001
0.316
0.088
<0.001
<0.001
<0.001

Conclusion: Patients with COPD have stiffer pulmonary arteries compared to healthy individuals, as measured by PA-PWV using the Q/A method. Further analysis will investigate the association between pulmonary artery stiffness and cardiac function.