P51: NON-CONTACT MEASUREMENT OF LOCAL CAROTID AND CAROTID-FEMORAL PULSE WAVE VELOCITY BY LASER DOPPLER VIBROMETRY: VALIDATION OF A NEW DEVICE AGAINST REFERENCE TECHNIQUES IN HYPERTENSIVE PATIENTS

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Table 1. MRI and US measurements of D, U and PWV. Data are means ± standard deviations (n=8).

<table>
<thead>
<tr>
<th></th>
<th>Min D (cm)</th>
<th>Max D (cm)</th>
<th>Min U (m/s)</th>
<th>Max U (m/s)</th>
<th>PWV (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI</td>
<td>2.5±0.4</td>
<td>3.0±0.3</td>
<td>0.1±0.0</td>
<td>0.9±0.2</td>
<td>3.5±0.8</td>
</tr>
<tr>
<td>US</td>
<td>2.4±0.2</td>
<td>2.8±0.2</td>
<td>0.3±0.1</td>
<td>1.1±0.2</td>
<td>3.6±1.0</td>
</tr>
</tbody>
</table>

References

PS1
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Objective: PWV measurement devices are technically demanding, expensive and prone to artefacts, thus limiting the measurement of arterial stiffness in primary care. The CARDIS consortium developed a non-contact device based on the detection of skin movements induced by arterial pulses through a laser Doppler vibrometer (CARDIS-LDV). Our objective is to validate CARDIS-LDV against reference techniques.

Methods: This study sponsored by INSERM will include 100 essential hypertensives, males and females, grade I–III, aged 18–80. The CARDIS-LDV comprises two rows of 6 laser beams spaced 5 mm (2.5 cm wide). These rows are either situated 2.5 cm apart for local PWV measurement or can be split in two for carotid to femoral measurement. To calculate PWV, the time delay between the two rows is assessed by analyzing the corresponding skin displacement signals. Aortic stiffness is measured by the Sphygmocor® technique and carotid stiffness by echotracking ArtLab®.

Results: Measurements by CARDIS-LDV are easy and fast to perform. A simple palpation of pulse is enough to position the device and obtain good signals thanks to the 6-beam array. Figure 1 shows an example of a carotid-femoral recording on a healthy volunteer (age 28). PWV is 5.88 ± 0.30 m/s using the maximum of 1st derivative method, compared with 5.96 ± 0.40 m/s with tonometry. Data on larger sample size will be presented at the meeting.

Conclusion: CARDIS-LDV is a promising technique to assess arterial stiffness; we expect to demonstrate its good agreement with reference techniques and that it improves the screening of cardiovascular risk in large populations.