Adjustment for blood pressure when measuring pulse wave velocity in newly diagnosed untreated hypertensive patients

Strandhave C¹, Svensson M², Holdensen K¹, Skov CM¹, Krarup H³, Christensen JH¹

¹Department of Nephrology, Aalborg Hospital, Aarhus University Hospital
²Department of Nephrology, Skejby Hospital, Aarhus University Hospital
³Department of Clinical Biochemistry, Aalborg Hospital, Aarhus University Hospital

Aim
To investigate if mean arterial pressure (MAP) was superiorly correlated to pulse wave velocity (PWV) compared to systolic blood pressure (sysBP) in newly diagnosed untreated hypertension.

Background
PWV:
- A valid and well-documented predictor of cardiovascular risk in hypertensive patients
- Age and blood pressure (BP) modulate the level of PWV
- Essential to adjust for these potential confounders
- SysBP has been widely used for adjustment

Laurent S et al. Aortic stiffness is an independent predictor of all-cause and cardiovascular mortality in hypertensive patients Hypertension 2001; 37: 1236-1241
- In recent years, MAP has been favored

Determinants of pulse wave velocity in healthy people and in the presence of cardiovascular risk factors: “establishing normal and reference values”. Eur Heart Jour 2010; 31: 2338–2350

Methods
- 126 newly diagnosed untreated hypertensive patients
- Recruited at the general practitioners’ office in the municipality of Aalborg, Denmark

BP:
- 24h ambulatory BP measurements

PWV:
- Applanation tonometry with the Sphygmocor device

Results
Table I: Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>126</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female (n)</td>
<td></td>
<td>67  (53%)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td>50  [26;73]</td>
</tr>
<tr>
<td>Smoking (n)</td>
<td></td>
<td>23  (18%)</td>
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<tr>
<td>Diabetes mellitus (n)</td>
<td></td>
<td>3  (2%)</td>
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<tr>
<td>Body mass index (kg/m²)</td>
<td></td>
<td>27  [19;41]</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td></td>
<td>145 [121;186]</td>
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<tr>
<td>Diastolic BP (mmHg)</td>
<td></td>
<td>89  [62;122]</td>
</tr>
<tr>
<td>Mean arterial pressure (mmHg)</td>
<td></td>
<td>107  [89;145]</td>
</tr>
<tr>
<td>Heart rate (min⁻¹)</td>
<td></td>
<td>73  [48; 113]</td>
</tr>
<tr>
<td>PWV (m/s)</td>
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<td>8.5  [3.3; 16.8]</td>
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Figure I Correlation between PWV and MAP

Figure II Correlation between PWV and sysBP

- Steiger’s test for equal correlation shows that despite numeric and graphic differences in correlation coefficients the correlations are not statistically different (p=.2)

Conclusion
- PWV measurements must be adjusted for age as well as BP
- Adjusting for sysBP may be superior to adjusting for MAP in newly diagnosed untreated hypertensive patients
- Both numerically and graphically the correlation coefficients are different but can not reach statistically different levels