Effect of different methods for mean arterial pressure measurement on patient-specific risks for PE

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Objective
To describe the correlation between clinical auscultation method with a sphygmomanometer (AMS) and the automatic electronic device (AED) for mean arterial pressure (MAP) measurement in first trimester, its significance, and its effect on the pre-eclampsia (PE) risks model.

Methods
MAP using AMS and AED was measured from 102 consecutive first trimester singleton pregnancies. Correlations were calculated according to distributions. Fisher’s z transformation tested the null hypothesis that $r \leq 0.800$ between methods. Distribution and correlations of the difference between methods were also calculated. Difference distribution was used for modelling patient-specific risks for PE, a 3-sigma value was used to achieve 99.7% confidence.

Results
A correlation of $r = 0.6462$ (CI95 0.5124 to 0.7494) between methods ($r^2=0.4176$), although statistically significant ($p<0.001$), failed to reject the Ho. Maternal weight significantly correlated different with each method: $r_{AMS}=0.387$ ($p<0.001$), and $r_{AED} =0.296$ ($p=0.003$). The mean difference between methods was -0.5 mmHg ± 5.6 SD. No correlation was found between MAP difference and maternal or pregnancy characteristics. Using 3 sigma value, the modelled patient-specific risks for PE resulted in either an underestimation of 6.9 to 13.6 times, or an overestimation of 3.9 to 7.9 times the actual risks model.

Conclusion
There is a statistically significant but clinically unacceptable correlation between methods, wide random variation and different weight correlation coefficients could bias the risks model performance. Reproducibility of first trimester screening model should comply with the specific validated measurement method.