Repeatability of Different Segmental Pulse Wave Velocity Measurements

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To the Editor: We would like to congratulate Meyer et al. for their extensive and innovative study (“Repeatability of Central and Peripheral Pulse Wave Velocity Measures: The Atherosclerosis Risk in Communities (ARIC) Study”) on the repeatability of several different measures of pulse wave velocity (PWV) at different time scales. The repeatability of brachial-to-ankle PWV was characterized as excellent and that of carotid-to-femoral and femoral-to-ankle PWV as fair, based on the values of intraclass correlation coefficient. Beyond the intraclass correlation coefficient values, the bias (difference) between 2 repeated measures and the SD of differences is also widely and very commonly used for the classification of repeatability. Moreover, Bland–Altman analysis, a very commonly used method for the assessment of measurement reproducibility in medical literature, can provide additional information mostly concerning the trend of bias to be related with the level of the mean value of the measured parameter.

Based on the guidelines of the ARTERY Society for the validation of noninvasive devices for measurement of arterial PWV, a maximum of 1-month interval between measurements (visits) is recommended in order to avoid bias due to effect of aging and variation in other confounding influences. Thus, the 4- to 8-week period in this study may be in part related with the lower repeatability of aortic PWV due to biologic reasons rather than technical reasons. Also, according to these guidelines, the accuracy (and the reproducibility respectively) is characterized as (i) excellent when mean difference is ≤0.5 m/s and SD of difference is ≤1.8 m/s, (ii) acceptable when mean difference is <1.0 m/s and SD of difference is ≤1.5 m/s, and (iii) poor when mean difference is ≥1.0 m/s and SD of difference is >1.5 m/s. On the basis of these cutoff values, the repeatability of PWV values could be reclassified. For example, on the basis of the data in Table 2 reported in the study of Meyer et al. and the recommendation of the ARTERY Society, the between-visit repeatability of all PWV measurements is poor and the within-visit repeatability is fair. Thus, additional analysis using bias differences and Bland–Altman plots, as described above, would improve correct classification of PWV repeatability and strengthen the study results as a guide to reconsider current recommendations.

Additionally, it has been well documented that the algorithm used for the estimation of pulse transit time is a critical methodological source of error for PWV measurement and it may also affect the reproducibility as well. Interpretation of this study’s findings would be substantially facilitated if the authors provided details about the algorithm used in their study, i.e., was the tangential or other method used for pulse transit time estimation for each segmental PWV measurement?

Finally, strength of this study is that it was conducted on elderly population, for which relevant data in the literature is largely missing. Conversely, measured PWV values were very high, exceeding in several cases the respective normal and reference values possibly due to unique characteristics of this population. Therefore, particular attention should be given when extrapolating the results of this study to other populations.

DISCLOSURE
The authors declared no conflict of interest.

REFERENCES

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