Estimation of Aortic Blood Pressures and Pulse Wave Velocity in Obese Children: A Technological Perspective

To the Editor:

We read with great interest the study of Lurbe et al. It is remarkable that noninvasive assessment of aortic blood pressures (BPs) and pulse wave velocity (PWV) was achieved in a large population of children including obese subjects. The reported findings are very relevant but we would like to comment on a few methodological issues and technological limitations.

It must be noted that the methodology of the SphygmoCor software has not been validated in children. The transfer function used to derive the aortic pressure wave has been validated only in adults using directly measured aortic and radial pressure waves. Because no childhood data are yet available to confirm the validity of the transfer function, its use in children may have decreased accuracy. Moreover, there is very limited information concerning the reproducibility of applanation tonometry and central BP estimation in children. It would be quite useful if Lurbe et al. could provide reproducibility data for this special population, especially for obese children. Therefore, the absolute values in this article regarding central BP, augmentation index, and pulse pressure amplification should be treated with particular caution and reserve.

Another critical methodological issue concerns the calibration of the tonometric pressure waves. Most often brachial sphygmonometric systolic and diastolic BPs are used for calibration, but mean and diastolic BPs are also applied. Because different calibration methods might result in differences in central BP values, it should be clarified which method was applied.

There are 2 major sources of error in PWV calculation. One is related to the measurement of the distance between the 2 recording arterial sites. The accuracy of distance measurement between carotid and femoral artery may be reduced in obese children. A second potential source of error is the method used for wave “foot” detection for the calculation of pressure wave transit time. Several algorithms have been proposed with divergent results. The SphygmoCor Software offers various algorithms, such as the intersecting tangents method, maximum dP/dt, and maximum second derivative. Nevertheless, it has been shown that different algorithms can lead to differences in measured PWV of 5% to 15%. To allow direct comparisons between the PWV values of this study with other studies, it should be clarified which algorithm was applied.

In a recent meta-analysis, the ability of PWV to predict cardiovascular events and all-cause mortality was analyzed and quantified. In adults, a PWV change by 1 m/s was found to predict an ≥15% change in cardiovascular risk. It would be very interesting if Lurbe et al. could interpret the changes in PWV between different child groups or the PWV changes per 1-SD change of BP and weight in terms of the consequent cardiovascular risk increase.

Disclosures

None.

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