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.1 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.1 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 sphygmomanometric systolic and diastolic BPs are used for calibration, but mean and diastolic BPs are also applied.2 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.3 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%.4 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,5 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.3 It would be very interesting if Lurbe et al.1 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.

Theodore G. Papaioannou
Manolis Vavuranakis
Christodoulos Stefanadis
Biomedical Engineering Unit
1st Department of Cardiology
Hippokration Hospital, Medical School
National and Kapodistrian University of Athens
Athens, Greece


Letters to the Editor will be published, if suitable, as space permits. They should not exceed 1000 words (typed double-spaced) in length and may be subject to editing or abridgment.
Estimation of Aortic Blood Pressures and Pulse Wave Velocity in Obese Children: A Technological Perspective
Theodore G. Papaioannou, Manolis Vavuranakis and Christodoulos Stefanadis

Hypertension. 2012;60:e34; originally published online August 27, 2012;
doi: 10.1161/HYPERTENSIONAHA.112.201533

Hypertension is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2012 American Heart Association, Inc. All rights reserved.
Print ISSN: 0194-911X. Online ISSN: 1524-4563

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://hyper.ahajournals.org/content/60/4/e34

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published
in Hypertension can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial
Office. Once the online version of the published article for which permission is being requested is located,
click Request Permissions in the middle column of the Web page under Services. Further information about
this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Hypertension is online at:
http://hyper.ahajournals.org//subscriptions/