Can We Afford Crude Estimates of Central Pulse Pressure?

To the Editor:

The article by de Simone et al in the April 2005 issue of *Hypertension* reports associations of high brachial pulse pressure (PP) with both arterial stiffness and left ventricular mass in 472 normotensive and 778 untreated hypertensive patients. Arterial stiffness was noninvasively estimated by the central PP-to-stroke volume ratio. Central PP was estimated from brachial PP “using age-adjusted equation previously generated in 230 normotensive and hypertensive subjects.” We think the following comments are needed.

Whereas the associations reported are plausible on pathophysiological grounds, the calculations appear far less reliable because of potential bias in the estimation of central PP. Concerning the equation they used, the authors make reference to their previous article where we can read that brachial PP and age “explained 38% of variance of central PP (P<0.0001)” determined by carotid aplanation tonometry in 145 unmedicated hypertensive patients and 85 normotensive subjects. How could the authors justify the use of an equation that ignores other factors responsible for nearly two-thirds of the variability of central PP? Further calculations of arterial stiffness and precise factorial analysis also appear especially hazardous. Finally, it is widely admitted that correlation is not estimation. Before applying this equation, one must have validated the accuracy and precision of the estimate on a new sample, and the pressure-dependence of the bias must be tested before applying the same equation in normotensive and hypertensive subjects. Have the investigators considered these issues?

Hypertension is a major public health challenge and there is increasing interest in central hemodynamics because indices that measure central PP may be more directly related to cardiovascular events than brachial PP. We cannot afford imprecise and unvalidated estimates of central PP. Until the validation issues are resolved, the generalization of the age-adjusted equation must be avoided.

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Response: Widely Possible Versus Selectively Perfect

We thank Chemla and Nitenberg for the important technical clarifications. We share their concern, as can be seen in the Discussion of our article. We do not want to suggest using brachial PP carelessly instead of directly measured central PP, nor do we want to suggest, at least at this time, that every hypertensive patient undergo “central hemodynamic” to “measure central pulse pressure” under the suggestion that this might be more directly related to incident cardiovascular disease than indirect imperfect measures widely available.

The goal of this study was to focus attention of clinicians taking care of hypertensive patients on the fact that high brachial pulse pressure (something that every doctor can detect easily in office without further economical burden) increases the chance of preclinical cardiovascular disease, detectable with an echo-cardiogram (or even perhaps with other even cheaper nonultrasound techniques), a goal that we believe was achieved in our article. As said, we think that this simple observation might have implications for risk stratification and for clinical practice. The use of the imprecise pulse pressure/stroke volume ratio on epidemiological scale was needed, despite the indisputable intrinsic technical pitfalls (which might be considered substantial for focused pathophysiological experiments), because this simple index is associated with increased risk, independently of the presence of left ventricular hypertrophy. We do not think we can measure central pulse pressure in every hypertensive patient, which we agree would be almost perfect. We still prefer imperfect but possible things to perfect but impractical solutions.

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