Dipping Deeper Into the Ambulatory Arterial Stiffness Index
Ahmet Adiyaman, José Boggia, Yan Li, Ji-Guang Wang, Eoin O’Brien, Tom Richart, Lutgarde Thijs and Jan A. Staessen
Hypertension 2007;50:e59-e60; originally published online Jul 16, 2007;
DOI: 10.1161/HYPERTENSIONAHA.107.094664
Hypertension is published by the American Heart Association. 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2007 American Heart Association. 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/cgi/content/full/50/3/e59

Subscriptions: Information about subscribing to Hypertension is online at http://hyper.ahajournals.org/subscriptions/
Permissions: Permissions & Rights Desk, Lippincott Williams & Wilkins, a division of Wolters Kluwer Health, 351 West Camden Street, Baltimore, MD 21202-2436. Phone: 410-528-4050. Fax: 410-528-8550. E-mail: journalpermissions@lww.com
Reprints: Information about reprints can be found online at http://www.lww.com/reprints
Dipping Deeper Into the Ambulatory Arterial Stiffness Index

To the Editor:

Methodologic and conceptual issues seriously weaken the conclusions of Schillaci et al\(^1\) on the ambulatory arterial stiffness index (AASI), as published in the May 2007 issue of *Hypertension*.

Schillaci et al\(^1\) reported that, in 515 untreated patients, AASI depended on the nocturnal blood pressure fall. We confirmed this observation in our Flemish population study.\(^2\) The correlation coefficients were similar to those in the report by Schillaci et al\(^1\): −0.24 versus −0.28 for systolic blood pressure (2-sided \(P\) value computed by Fisher’s \(Z\) transformation, 0.42), and −0.39 versus −0.46 for diastolic blood pressure (\(P=0.11\)). However, the ambulatory recording of 1 of the representative patients of Schillaci et al\(^1\) included \(\approx\)25 nighttime and \(\approx\)35 daytime readings. The night/day ratio of the number of blood pressure readings was therefore 0.71, whereas in our studies,\(^2,3\) it was \(\approx\)0.30. As shown in the Figure, this ratio influences estimates of AASI. Furthermore, in our 166 Chinese volunteers,\(^3\) in whom we measured AASI and pulse wave velocity (PWV) within 24 hours, the correlation coefficients with the percentage fall in nocturnal blood pressure were similar for PWV and AASI (MTERT statement in the PROC REG procedure of the SAS package, version 9.1.3; \(P>0.54\)), amounting to −0.54 and −0.49 for systolic dipping and to −0.56 and −0.57 for diastolic dipping.

Schillaci et al\(^1\) did not seek survival of AASI in the multivariate-adjusted association with left ventricular mass index. In Table 3 of their report,\(^1\) they introduced not independent but highly intercorrelated predictors, bound to remove AASI from the model. The correlation between the daytime systolic pressure and the nocturnal fall in systolic blood pressure is close, because computation of the latter requires use of the former. Schillaci et al\(^1\) did not report the \(t\)-to-enter for AASI and the variable, probably the daytime systolic blood pressure, that excluded AASI to remain in the model. More importantly, Schillaci et al\(^1\) failed to demonstrate that, with similar adjustments applied as for AASI, the association between left ventricular mass index and PWV remained significant.

In line with our first report on AASI,\(^3\) Schillaci et al\(^1\) found significant (\(P<0.001\)) association between PWV and AASI, although the correlation coefficient was lower (0.28 versus 0.51; \(P=0.0039\)). Schillaci et al\(^1\) must be aware of Bland and Altman’s\(^4\) recommendations for assessing concordance between 2 measurements and our analyses complying with these recommendations.\(^5\) Nevertheless, the Italian investigators did not go beyond reporting a correlation coefficient as measure of agreement. Moreover, it is conceptually wrong in the assessment of concordance between measurements to adjust for common determinants underlying the measured trait. In our Chinese volunteers,\(^3\) mean arterial pressure removed the association between PWV and AASI. That accounting for common determinants weakens the correlation between PWV and AASI actually corroborates that these 2 measurements reflect arterial stiffness.

Association of the AASI with the number of daytime and nighttime readings in 1127 subjects randomly recruited from a Flemish population.\(^2\)

\(^{(1)}\)@hypertension{hypertension} 2007;50:e59–e60.
© 2007 American Heart Association, Inc.
*Hypertension* is available at http://hyper.ahajournals.org
DOI: 10.1161/HYPERTENSIONAHA.107.094664

Downloaded from hyper.ahajournals.org\(\) by Eoin O’Brien on September 1, 2007
In conclusion, we confirmed that AASI is inversely correlated with the nocturnal fall in blood pressure, especially in ambulatory recordings with a disproportionately large number of nighttime readings. We concur with the idea that AASI is an indirect measure of arterial stiffness.\textsuperscript{3,5} However, we disagree with inappropriate or unnecessary adjustment in regression models,\textsuperscript{1} and we regret that the information on the correlations of left ventricular mass index with AASI and PWV was incomplete.\textsuperscript{1}

**Sources of Funding**
The Fonds voor Wetenschappelijk Onderzoek Vlaanderen, Ministry of the Flemish Community (Brussels, Belgium; grants G.0424.03 and G.0575.06) and the University of Leuven (OT/00/25 and OT/05/49) supported the Flemish population study. The European Union (LSHM-CT-2006-037093 InGenious HyperCare) facilitated networking between the Shanghai Jiaotong University Medical School and the University of Leuven. The Nederlandse Hartstichting (Dr E. Dekker student grant), Den Haag, The Netherlands, supported the fellowship of A.A. in Leuven.

**Disclosures**
None.

Ahmet Adiyaman  
**Nymegen Medical Centre**  
Department of General Internal Medicine  
Radboud University  
Nymegen, The Netherlands

José Boggia  
**Department of Pathophysiology**  
Universidad de la República

Montevideo, Uruguay

Yan Li  
Ji-Guang Wang  
Shanghai Institute of Hypertension  
Shanghai Jiaotong University Medical School  
Shanghai, China

Eoin O'Brien  
Conway Institute of Biomolecular and Biomedical Research  
University College Dublin, Ireland

Tom Richart  
Lutgarde Thijs  
Jan A. Staessen  
Department of Cardiovascular Diseases  
University of Leuven  
Leuven, Belgium