

CORRESPONDENCE

Ambulatory (AASI), but not home (HASI), arterial stiffness index is associated with aortic pulse wave velocity

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The dynamic relation between systolic and diastolic blood pressure (BP) in 24-h ambulatory BP recordings reflects arterial stiffness.^{1,2} We defined the ambulatory arterial stiffness index (AASI) as unity minus the regression slope of diastolic on systolic BP in 24-h BP recordings. AASI correlated with aortic pulse wave velocity (aPWV) and the central and peripheral pulse pressures and augmentation indexes.¹ Furthermore, independent of 24-h pulse pressure and aPWV, AASI predicts cardiovascular mortality and morbidity, in particular fatal and non-fatal stroke.^{2,3} AASI, therefore, holds promise for the stratification of cardiovascular risk.

In this journal, Stergiou *et al.*⁴ recently introduced the home arterial stiffness index (HASI) based on the self-measured BP. They reported that HASI correlated less with age, systolic BP and pulse pressure than AASI. They proposed that HASI might not replace AASI in the assessment of arterial stiffness. However, the study by Stergiou *et al.*⁴ did not include a direct measure of arterial stiffness. We, therefore, compared the association of aPWV with HASI and AASI in 67 consecutive patients, all untreated, who were referred for the diagnosis of hypertension to Ruijin Hospital. Within 1 week, the patients underwent 24-h ambulatory BP monitoring, self-measurement of BP at home, and an assessment of aPWV. Oscillometric SpaceLabs 90217 monitors (SpaceLabs Inc, Redmond, WA, USA) recorded BP at 20-min intervals from 0800 to 2200 h, and at 30-min intervals from 2200 to 0800 h. Daytime and nighttime ranged from 0800 to 1800 h and from 2300 to 0500 h, respectively. Patients measured BP at home in the morning (before breakfast) and in the evening (2 h after dinner) on 7 consecutive days, using the Omron HEM-7051 device (Omron Health Care, Kyoto, Japan).

Each self-measurement session consisted of three readings at 1-min intervals after subjects had relaxed for 5 min in the sitting position. aPWV was measured using a high-fidelity SPC-301 micromanometer (Millar Instruments, Houston, TX, USA) interfaced with a laptop computer running the SphygmoCor software, version 8.2 (AtCor Medical, New South Wales, Australia). We compared means and correlation coefficients, using two-tailed tests for paired observations with the 24-h ambulatory statistics as reference. Bonferroni's correction for multiple comparisons was applied.

Of 67 participants, 34 (50.8%) were female and 41 (61.2%) had ambulatory hypertension (24-h BP \geq 130/80 mm Hg). Age averaged 53.6 years (range, 30–73) and aPWV $8.0 \pm 1.6 \text{ m s}^{-1}$. The number of BP readings was highest for 24-h AASI (Table 1). HASI was higher ($P < 0.001$) than 24-h and nighttime AASI, but similar to daytime AASI ($P = 0.20$

after Bonferroni's correction). The 24-h AASI ($r = 0.43$; $P = 0.003$), but not daytime AASI ($r = 0.11$; $P = 0.36$) and nighttime AASI ($r = 0.22$; $P = 0.07$), significantly correlated with aPWV. The significant correlation of 24-h AASI with aPWV was of similar magnitude as in our previous study (correlation coefficient, 0.51; $P = 0.49$ for unpaired comparison).¹ aPWV did not significantly correlate with any estimate of HASI, irrespective of the timing or number of BP self-measurements ($P \geq 0.28$, Table 1). In pairwise comparisons, correlations of aPWV with HASI were significantly weaker than those with 24-h AASI (Table 1). These findings contrast with those of Qureshi *et al.*,⁵ who reported that in 21 subjects aPWV correlated with HASI ($r = 0.45$; $P = 0.04$; $P = 0.064$ for unpaired comparison with our current estimate of -0.01).

In conclusion, aPWV correlates closer with AASI than HASI. In keeping with the suggestion Stergiou's of *et al.*,⁴ for the derivation of

Table 1 AASI and HASI in relation to aPWV in 67 untreated patients

Stiffness index	Mean number of BP readings \pm s.d.	Mean stiffness index \pm s.d.	aPWV	
			r	P
AASI				
24-h	59.0 \pm 5.8	0.42 \pm 0.11	0.43	0.003
Daytime	26.9 \pm 4.0 [‡]	0.53 \pm 0.17 [‡]	0.11*	0.36
Nighttime	11.8 \pm 0.5 [‡]	0.42 \pm 0.21	0.22	0.07
HASI				
All	39.4 \pm 6.7 [‡]	0.58 \pm 0.16 [‡]	-0.01 [†]	0.96
Morning	20.2 \pm 2.8 [‡]	0.67 \pm 0.20 [‡]	0.13*	0.28
Evening	19.2 \pm 4.1 [‡]	0.57 \pm 0.19 [‡]	0.08*	0.54

Abbreviations: AASI, ambulatory arterial stiffness index; aPWV, aortic pulse wave velocity; BP, blood pressure; HASI, home arterial stiffness index. Significance of the difference vs. 24-h AASI after Bonferroni's correction for multiple comparisons ($n = 5$): * $P < 0.05$; [†] $P < 0.01$; and [‡] $P < 0.001$.

the arterial stiffness index, BP self-measurement should not be considered as alternative to 24-h ambulatory monitoring. As already reported before,⁶ recording BP for <24 h can also not be recommended. Furthermore, AASI is determined by the ratio of the number of night to day BP readings.⁷ When the time intervals between BP measurements were longer during the nighttime, as in our study, the influence of nocturnal BP characteristics on the derived AASI values might be underestimated. It would be reasonable that for the determination of AASI, time intervals between successive BP readings were equal during the daytime and nighttime periods.

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