Online Supplement

Wave Reflection And Arterial Stiffness In The Prediction Of 15-Year All-Cause And Cardiovascular Mortalities: A Community-Based Study

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Short title: Wave reflections and cardiovascular mortality

Table S1. Age-stratified hazard ratios and 95% confidence intervals per one-standard deviation increment of each variable for 15-year all-cause and cardiovascular moralities by univariate analysis

Parameters	All-cause mortality		Cardiovascular mortality	
	Age < 55 (n=727)	Age ≥ 55 (n= 545)	Age < 55 (n=727)	Age ≥ 55 (n= 545)
PWV	**1.33 (1.07-1.60)**	**1.38 (1.22-1.56)**	**1.51 (1.10-2.07)**	**1.50 (1.21-1.87)**
AI	**1.40 (1.03-1.91)**	0.95 (0.82-1.10)	1.74 (0.98-3.08)	1.26 (0.96-1.66)
Pi	1.03 (0.76-1.39)	**1.37 (1.20-1.55)**	1.49 (0.91-2.45)	**1.51 (1.20-1.90)**
Pa	**1.43 (1.15-1.76)**	1.07 (0.92-1.23)	**1.67 (1.21-2.32)**	**1.34 (1.06-1.71)**
RWTT	1.02 (0.75-1.38)	1.06 (0.93-1.21)	0.61 (0.27-1.39)	0.67 (0.40-1.12)
RI	1.19 (0.86-1.62)	0.93 (0.81-1.07)	1.71 (0.91-3.22)	1.31 (0.97-1.77)
Pf	1.20 (0.90-1.61)	**1.32 (1.16-1.50)**	1.54 (0.93-2.54)	**1.47 (1.17-1.86)**
Pb	**1.33 (1.03-1.73)**	**1.25 (1.09-1.43)**	**1.83 (1.24-2.71)**	**1.61 (1.26-2.05)**

Numbers in bold letters indicate statistical significance.

AI = carotid augmentation index; Pi = incident pressure wave height; Pa = augmented pressure; Pb = backward pressure amplitude; Pf = forward pressure amplitude; PWV = carotid-femoral pulse wave velocity; RI = reflection index; RWTT = reflected wave transit time.

Table S2. Central blood pressure and wave reflection measures derived from carotid pressure

waveform calibrated by seated brachial MBP and DBP or supine central SBP and DBP

Parameters	Women (n= 598)	Men (n= 674)	P values
Calibrated by seated brachial MBP and DBP			
Central SBP, mmHg*	129 ± 26	126 ± 22	0.048
Central PP, mmHg*	44 ± 17	39 ± 14	<0.001
Pi, mmHg	34 ± 12	35 ± 11	0.189
Pa, mmHg	10 ± 9	5 ± 6	<0.001
Pf, mmHg	33 ± 12	34 ± 11	0.168
Pb, mmHg	17 ± 7	14 ± 6	<0.001
Calibrated by supine central SBP and DBP†			
Central SBP, mmHg	139 ± 26	135 ± 20	0.009
Central PP, mmHg	66 ± 18	62 ± 15	<0.001
Pi, mmHg	52 ± 13	55 ± 13	<0.001
Pa, mmHg	14 ± 12	7 ± 8	<0.001
Pf, mmHg	47 ± 14	52 ± 16	<0.001
Pb, mmHg	22 ± 7	19 ± 7	<0.001

*: cited from J Hypertens. 2009;27:461-467.

†: Supine brachial blood pressure was taken immediately after the carotid tonometry by a computer-controlled sphygmomanometer (CardioSpec 2000, SRD Medical, Shorashim, Israel). Blood pressure measurements taken by such device have been shown to be close to the invasive aortic blood pressure measurements (correlation coefficient of 0.98 and a standard error of the estimate of 6.1 mmHg for both systolic and diastolic blood pressure). [Hypertension 1993;21:74-82]

DBP = diastolic blood pressure; MBP = mean blood pressure; Pi = incident pressure wave height; Pa = augmented pressure; Pb = backward pressure amplitude; Pf = forward pressure amplitude; PP = pulse pressure; SBP = systolic blood pressure.

Table S3. Sex-stratified Pearson correlation coefficients of parameters of blood pressure, aortic stiffness and wave reflection with various target-organ indices

Parameters	Women (n= 598)				Men (n= 674)			
	LVMI	IMT	eGFR	PWV	LVMI	IMT	eGFR	PWV
Calibrated by seated brachial MBP and DBP								
Central SBP	0.51‡	0.33‡	-0.23‡	0.49‡	0.32‡	0.20‡	-0.19‡	0.38‡
Central PP	0.46‡	0.34‡	-0.28‡	0.45‡	0.30‡	0.23‡	-0.19‡	0.36‡
Pi	0.36‡	0.28‡	-0.22‡	0.39‡	0.21‡	0.14‡	-0.11†	0.29‡
Pa	0.41‡	0.29‡	-0.25‡	0.37‡	0.31‡	0.27‡	-0.24‡	0.28‡
Pf	0.41‡	0.28‡	-0.26‡	0.40‡	0.21‡	0.16‡	-0.10†	0.26‡
Pb	0.47‡	0.34‡	-0.25‡	0.44‡	0.32‡	0.22‡	-0.22‡	0.33‡
Calibrated by supine central SBP and DBP*								
Central SBP	0.50‡	0.25‡	-0.12†	0.46‡	0.29‡	0.14‡	-0.10†	0.31‡
Central PP	0.44‡	0.24‡	-0.12†	0.41‡	0.25‡	0.14‡	-0.06	0.22‡
Pi	0.27‡	0.11†	0.00	0.27‡	0.11†	0.00	0.08	0.09§
Pa	0.40‡	0.26‡	-0.20‡	0.36‡	0.30‡	0.27‡	-0.23‡	0.25‡
Pf	0.25‡	0.08	-0.06	0.24‡	0.00	-0.04	0.14‡	-0.02
Pb	0.43‡	0.27‡	-0.11†	0.40‡	0.30‡	0.17‡	-0.16‡	0.26‡

†: *P* value <0.01

‡: *P* value <0.001

*: Supine brachial blood pressure was taken immediately after the carotid tonometry by a computer-controlled sphygmomanometer (CardioSpec 2000, SRD Medical, Shorashim, Israel). Blood pressure measurements taken by such device have been shown to be close to the invasive aortic blood pressure measurements (correlation coefficient of 0.98 and a standard error of the estimate of 6.1 mmHg for both systolic and diastolic blood pressure). [Hypertension 1993;21:74-82]

DBP = diastolic blood pressure; eGFR = estimated glomerular filtration rate; IMT = intima-media thickness; LVMI = left ventricular mass index; MBP = mean blood pressure; Pi = incident pressure wave height; Pa = augmented pressure; Pb = backward pressure amplitude; Pf = forward pressure amplitude; PP = pulse pressure; PWV = carotid-femoral pulse wave velocity; SBP = systolic blood pressure.

Table S4. Hazard ratios and 95% confidence intervals per one-standard deviation increment of each variable for 15-year all-cause and cardiovascular moralities by univariate analysis

Parameters	All-cause mortality		Cardiovascular mortality	
	Women (n= 598)	Men (n= 674)	Women (n= 598)	Men (n= 674)
Calibrated by seated brachial MBP and DBP				
Central SBP	**1.79 (1.48-2.17)**	**1.23 (1.05-1.45)**	**2.76 (1.96-3.90)**	**1.68 (1.26-2.22)**
Central PP	**1.99 (1.68-2.37)**	**1.54 (1.35-1.75)**	**2.69 (2.01-3.61)**	**1.62 (1.28-2.06)**
Pi	**1.99 (1.69-2.35)**	**1.41 (1.24-1.61)**	**2.69 (2.01-3.54)**	1.30 (0.99-1.71)
Pa	**1.49 (1.26-1.76)**	**1.48 (1.31-1.68)**	**1.70 (1.28-2.26)**	**1.80 (1.47-2.21)**
Pf	**1.96 (1.66-2.32)**	**1.40 (1.22-1.61)**	**2.49 (1.88-3.30)**	**1.36 (1.04-1.78)**
Pb	**1.83 (1.54-2.18)**	**1.55 (1.35-1.77)**	**2.48 (1.85-3.31)**	**1.75 (1.37-2.22)**
Calibrated by supine central SBP and DBP*				
Central SBP	**1.65 (1.38-1.98)**	1.11 (0.94-1.32)	**2.43 (1.80-3.26)**	**1.69 (1.27-2.25)**
Central PP	**1.83 (1.53-2.19)**	**1.27 (1.09-1.50)**	**2.50 (1.87-3.35)**	**1.49 (1.11-1.99)**
Pi	**1.66 (1.40-1.98)**	1.01 (0.85-1.20)	**2.24 (1.70-2.96)**	0.93 (0.67-1.30)
Pa	**1.45 (1.21-1.73)**	**1.40 (1.24-1.59)**	**1.70 (1.25-2.30)**	**1.67 (1.38-2.01)**
Pf	**1.35 (1.19-1.54)**	0.89 (0.75-1.07)	**1.47 (1.22-1.78)**	0.79 (0.55-1.14)
Pb	**1.64 (1.36-1.97)**	**1.35 (1.16-1.57)**	**2.34 (1.73-3.16)**	**1.67 (1.28-2.16)**

Numbers in bold letters indicate statistical significance.

*: Supine brachial blood pressure was taken immediately after the carotid tonometry by a computer-controlled sphygmomanometer (CardioSpec 2000, SRD Medical, Shorashim, Israel). Blood pressure measurements taken by such device have been shown to be close to the invasive aortic blood pressure measurements (correlation coefficient of 0.98 and a standard error of the

estimate of 6.1 mmHg for both systolic and diastolic blood pressure). [Hypertension 1993;21:74-82]

DBP = diastolic blood pressure; MBP = mean blood pressure; Pi = incident pressure wave height; Pa = augmented pressure; Pb = backward pressure amplitude; Pf = forward pressure amplitude; PP = pulse pressure; SBP = systolic blood pressure.

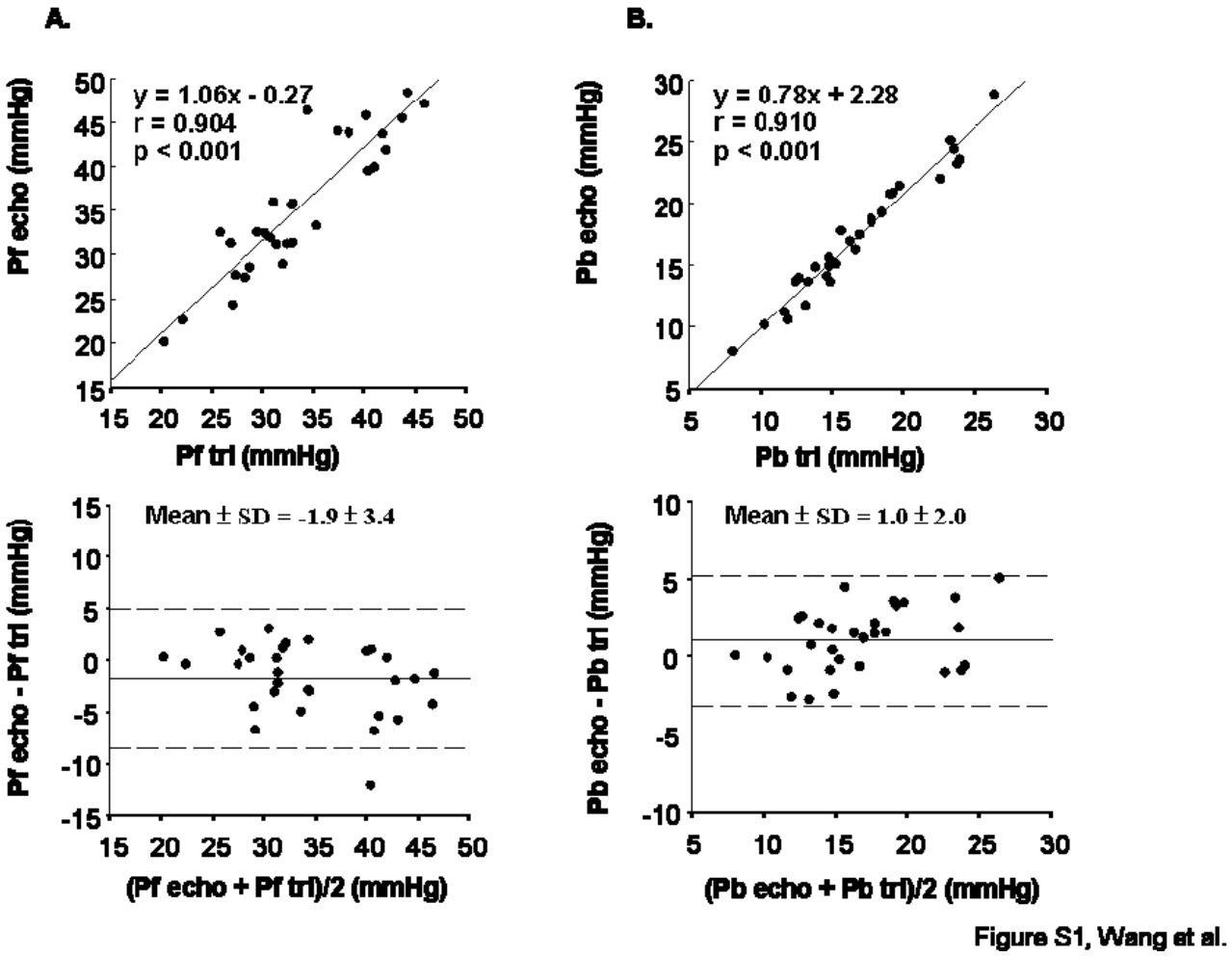

Figure S1: Pf and Pb calculated by using the triangular-shaped flow wave (Pf tri and Pb tri, respectively) have been compared with those calculated by using the true aortic flow wave derived from Doppler echocardiography (Pf echo and Pb echo, respectively) in another 30 subjects in our laboratory. The figure shows the Bland-Altman analysis. Panel A, agreement between Pf tri and Pf echo; Panel B, agreement between Pb tri and Pb echo. Dashed lines indicate the boundaries of 2 standard deviations of the differences. Solid lines indicate the mean of the differences.

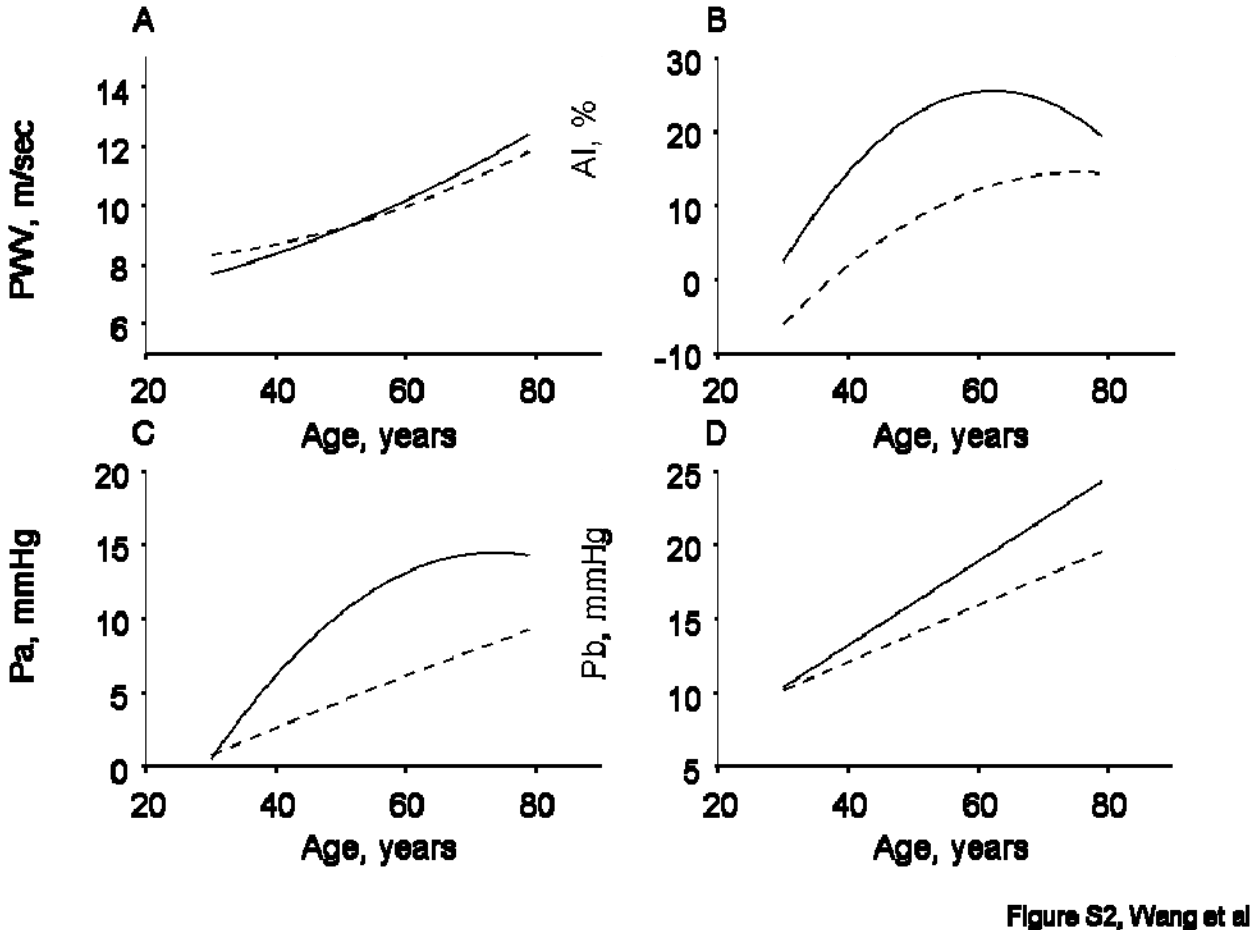

Figure S2: To explore the age-related effects on carotid-femoral PWV and carotid pressure waveform analysis variables, regression equations were derived for each gender with first- or second-order polynomial models. The figure shows non-linear and linear regression curves representing the effects of age on PWV (A), AI (B), Pa (C), and Pb (D) respectively, for women (solid lines) and men (dashed lines).