



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

Journal Home Page: <https://www.atlantis-press.com/journals/artres>

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To cite this article: V. Bell, W.A. Mitchell, S. Sigurðsson, J.J. Westenber, J.D. Gotal, A. Torjesen, T. Aspelund, L.J. Launer, A. de Roos, V. Gudnason, T.B. Harris, G.F. Mitchell (2014) PO-01: LONGITUDINAL AND CIRCUMFERENTIAL STRAIN OF THE PROXIMAL AORTA, Artery Research 8:4, 166–166, DOI: <https://doi.org/10.1016/j.artres.2014.09.007>

To link to this article: <https://doi.org/10.1016/j.artres.2014.09.007>

Published online: 7 December 2019



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Available online at www.sciencedirect.com

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journal homepage: www.elsevier.com/locate/artres

NAA Poster Presentation Abstracts

PO-01

LONGITUDINAL AND CIRCUMFERENTIAL STRAIN OF THE PROXIMAL AORTA

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Objectives: Proximal aortic stiffness increases with age and contributes to pathogenesis of wide pulse pressure and epidemic proportions of isolated systolic hypertension, which is difficult to control. Elucidation of factors that contribute to abnormal mechanical properties of the proximal aorta may facilitate development of more effective interventions. During systole there is substantial aortic long axis displacement and longitudinal strain, which we hypothesize causes overestimation of ascending aortic stiffness calculated from circumferential strain.

Methods: We performed magnetic resonance imaging in 375 participants (72 to 94 years of age, 204 women) in the Age, Gene/Environment Susceptibility-Reykjavik Study and measured circumferential and longitudinal strain along the aortic arch. Local pulse wave velocity (PWV) was calculated from circumferential strain and central pulse pressure using the Bramwell-Hill equation.

Results: Observed circumferential area strain was lower (geometric mean [95% confidence interval], 7.7 [7.3, 8.1] vs. 12.7 [12.2, 13.2]%, $P < 0.001$) and PWV was higher (11.0 [10.7, 11.3] vs. 8.5 [8.3, 8.8] m/s, $P < 0.001$) in the proximal ascending versus proximal descending thoracic aorta. In contrast, peak flow was similar at the two locations (39 [38, 40] vs. 39 [38, 40] cm/s, $P = 0.78$), which was inconsistent with observed differences in strain and PWV. When ascending aortic circumferential strain was corrected for longitudinal strain ($7.8 \pm 2.6\%$), PWV was comparable in the ascending and descending aorta (8.3 [8.2, 8.5] vs. 8.5 [8.3, 8.8] m/s, $P = 0.074$), consistent with comparable flow velocities.

Conclusion: Longitudinal strain represents a substantial and previously ignored component of proximal aortic volume storage that should be considered in order to avoid misclassification of ascending aortic stiffness.

PO-02

EFFECTS OF ACUTE INDUCED INFLAMMATION ON PRESSURE WAVEFORMS: DOES AGE MATTER?

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The Augmentation index (Alx) is a strong independent predictor of atherosclerosis. Aging is characterized by increased Alx and low grade

PO-02. Table 1

Variables		Baseline	Post 24-hr	Post 48-h	Time	Age	Interaction
aPP (mmHg)	YA	30±6	32±6	33±6	0.730	<0.001	0.001
	OA	43±10 [#]	41±10 [#]	39±9 ^{#,*}			
Alx	YA	7.80±11.26	3.05±11.14	4.60±11.54	0.085	<0.001	0.185
	OA	34.52±10.45 [#]	34.40±13.09	32.56±8.33			
Alx@75	YA	-1.40±12.3	-4.35±11.13	-5.05±10.61	0.132	<0.001	0.434
	OA	28.24±9.89 [#]	28.56±10.09	26.68±7.37			
cPWV	YA	5.38±0.76	5.48±0.90	5.50±1.05	0.681	<0.001	0.885
	OA	7.61±1.76 [#]	8.04±1.97	7.69±1.33			
FPH (mmHg)	YA	27±5	29±5	29±5	0.682	1.812	0.010
	OA	28±5	25±4 ^{#,*}	25±5			
RPH (mmHg)	YA	13±4	13±4	14±3	0.002	<0.001	<0.001
	OA	22±6 [#]	19±6 ^{#,*}	18±5 ^{#,*}			
IL-6 (ng/mL)	YA	0.89±0.57	2.29±2.14 [*]	1.14±1.33	<0.001	0.001	0.001
	OA	2.18±1.47 [#]	2.60±1.85	2.23±1.46 [#]			
CRP (mg/L)	YA	1.03±1.01	1.28±0.95	1.62±1.19	<0.001	0.002	0.492
	OA	2.60±2.19 [#]	3.94±3.76	4.38±4.13			

Data are mean±SD. BMI, body mass index; VO_{2peak}, peak oxygen consumption; aPP, aortic pulse pressure; Alx, augmentation index; Alx@75, augmentation index corrected for heart rate 75 bpm; cPWV, central pulse wave velocity; FPH, forward pulse height; RPH, reflected pulse height; IL-6, interleukin-6; CRP, C-reactive protein.

*Significantly different than baseline ($P < 0.05$).

[#]Significantly different than young adults ($P < 0.05$).