

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 inflammation. However, the effect of induced systemic inflammation on Alx is unclear.

Purpose: To investigate the effect of acute induced inflammation on wave reflection using wave separation analysis (WSA) in young (YA) vs. old adults (OA) pre-vaccination and 24-hr and 48-hr post vaccination.

Methods: Subjects were 22 YA (female=14; age 25±4 yrs; BMI 23.3±3.0 kg/m²) and 26 OA (female=17; age 63±6 yrs; BMI 29.6±6.3 kg/m²). Alx was assessed using applanation tonometry and followed by wave separation analysis (SphygmoCor, AtCor Medical). CRP and IL-6 were measured using ELISA assays.

Results: Compared to YA, OA had higher baseline aortic pulse pressure (aPP), Alx, Alx@75, central pulse wave velocity (cPWV), reflected wave pressure (RPH), IL-6, and CRP (*P*<0.05). Alx, Alx@75, and cPWV did not change from baseline, but were higher in OA at all time points (*P*<0.05). aPP, Forward wave pressure (FPH) and RPH decreased from baseline in OA (*P*<0.05), but did not change in YA. IL-6 increased from baseline at post 24-hr in YA, but not in OA (*P*<0.05). **Conclusions:** Although acute induced inflammation did not change indices of central arterial stiffness in OA, WSA revealed that FPH and RPH decreased in OA, concomitant with an aPP reduction. It appears that induced inflammation has a greater effect on arterial function and aPP in OA possibly due to greater effects of inflammation on peripheral vasodilatation in this group.

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