



# P85 Acute Systemic Inflammation Reduces both Carotid and Aortic Wave Reflection in Young Healthy Adults

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## ABSTRACT

Acute inflammation increases the risk of cardiac and cerebrovascular events, potentially associated with altered hemodynamic load. Wave reflection at the aorta and carotid artery can contribute to central hemodynamic load and provide insight into downstream changes in vascular tone. Acute inflammation may reduce wave reflection via downstream vasodilation, however, this is not firmly established and has only been investigated at the aorta.

**Purpose:** Explore the effect of acute inflammation on aortic and carotid hemodynamics and wave reflection.

**Methods:** Twenty-three young adults ( $26 \pm 4$  yrs,  $22.7 \pm 3.2$  kg/m<sup>2</sup>) underwent vascular measures at baseline and 24 h following typhoid vaccine-induced inflammation. Aortic (estimated from radial) and carotid pressure waveforms were obtained via tonometry. Augmentation index and wave separation analyses (WSA) were used to assess wave reflection. Aortic stiffness was estimated from single-point pulse wave velocity (PWV). Carotid beta-stiffness and arterial diameters were assessed via ultrasound.

**Results:** Acute inflammation reduced aortic and carotid wave reflection at 24 h (See Table 1 AIx, Reflection index,  $p < 0.05$ ). WSA did not reveal independent changes in forward or reflected wave magnitude, time to reflection, PWV, or beta-stiffness ( $p > 0.05$ ). Brachial and carotid artery diameter increased from  $3.79 \pm 0.76$  to  $3.86 \pm 0.76$  mm ( $p = 0.055$ ) and  $6.44 \pm 0.72$  to  $6.55 \pm 0.69$  mm ( $p = 0.04$ ), respectively.

**Conclusion:** Acute inflammation reduces aortic and carotid wave reflection in young adults, potentially due to downstream vasodilation. Although reduced wave reflection can decrease cardiac workload, reduced wave reflection in the carotid may render the brain vulnerable to pulsatile blood flow. These findings may implicate changes in wave reflections are a contributing mechanism behind acute inflammation-induced cerebrovascular risk.

Table 1

	n	Aortic			Carotid		
		Baseline	24-h	p-value	Baseline	24-h	p-value
SBP, mmHg	23	104 ± 10	104 ± 8	0.88	107 ± 11	107 ± 10	0.98
DBP, mmHg	23	72 ± 8	71 ± 7	0.23	71 ± 8	70 ± 7	0.26
MAP, mmHg	23	86 ± 9	85 ± 7	0.31	86 ± 9	85 ± 7	0.29
Pulse pressure, mmHg	23	32 ± 6	33 ± 8	0.21	36 ± 7	37 ± 8	0.39
AIx, %	23	3 ± 10	-1 ± 10	<b>0.04</b>	-4 ± 15	-9 ± 16	<b>0.04</b>
AIx@75, %	23	-6 ± 12	-9 ± 12	<b>0.048</b>	-13 ± 15	-18 ± 15	0.09
Augmented pressure, mmHg	23	1 ± 3	0 ± 3	0.05	-2 ± 6	-4 ± 7	0.08
Pf, mmHg	22	30 ± 7	31 ± 7	0.40	34 ± 8	36 ± 12	0.07
Pb, mmHg	22	14 ± 3	13 ± 4	0.24	16 ± 3	15 ± 4	0.09
Reflection index, au	22	47 ± 8	44 ± 9	<b>0.04</b>	48 ± 11	43 ± 13	<b>0.01</b>
Time to reflection, ms	22	158 ± 16	161 ± 20	0.20	180 ± 25	185 ± 26	0.53

All data mean ± standard deviation. SBP, systolic blood pressure; DBP, diastolic blood pressure; MAP, mean arterial pressure; AIx, augmentation index; Pf, forward wave magnitude; Pb, reflected wave magnitude.

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