

Acute Aerobic Exercise Attenuates Central Blood Pressure Reactivity to the Cold Pressor Test in Young Adults

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Background

- Augmented blood pressure (BP) reactivity to sympathetic activation evoked by the cold pressor test (CPT) is associated with an increased risk of incident hypertension.
 - Acute aerobic exercise has been shown to attenuate brachial BP reactivity to sympathetic activation, though whether it also attenuates central BP reactivity remains unclear.
 - Understanding central BP reactivity is important, as central BP is a stronger predictor of end organ damage and cardiovascular mortality than brachial BP.
- ✓ We tested the hypothesis that central BP reactivity to the CPT following acute aerobic exercise is attenuated.

Methods

- Subjects : Fifteen healthy adults (8 males and 7 females; 23 ± 2 years; 22.6 ± 2.6 kg/m²)
- Study Design : Randomized cross-over design
 - Acute aerobic exercise (30 min at 60% of heart rate reserve)
 - Quiet sitting as a time control
- Cold pressor test : left hand was immersed in an ice water bath (4°C) up to the wrist for 3 minutes
- Measurements : Heart rate and brachial and central BP were measured at baseline, during the CPT, and after the CPT

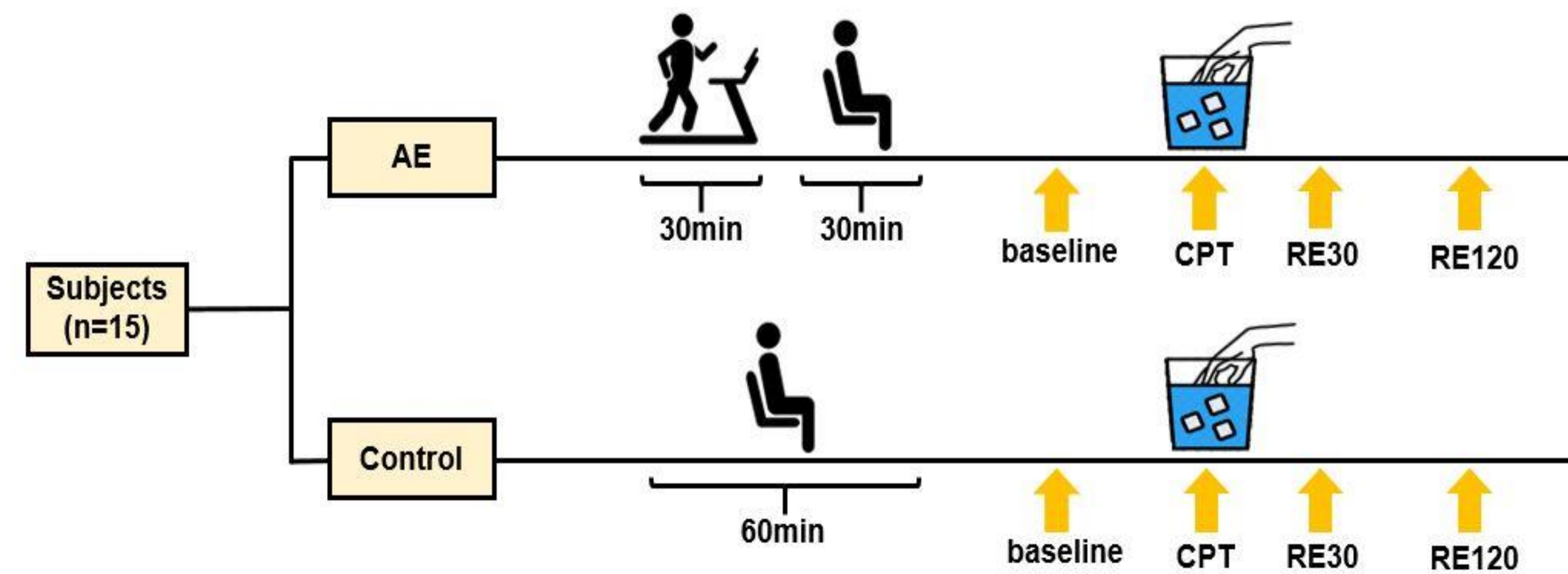


Figure 1. Experimental Design

Results

Table 1. Characteristics of subject (n=15)

Variables	Mean±SD
Age (yrs)	23±2
Height (cm)	173±8.8
Weight (kg)	68.9±12.6
BMI (kg/m ²)	22.6±2.6
Body Fat (%)	21.7±6.9
SBP (mmHg)	113.2±9.7
DBP (mmHg)	72.6±7.3
Resting HR (beat/min)	59.7±7.5

Table 2. Effects of acute aerobic exercise on during CPT and recovery

Variables	Trial	Baseline	CPT	Rec-30sec	Rec-120sec	p-value		
						Time	Trial	Interaction
HR (bpm)	AE	72.7±11.8	74.7±13.1	69.8±9.5	68.6±8.7	<.001	.001	<.001
	Control	56.67±7.8	67.93±11.8	58.47±8.6	59.5±8.7			
RPP	AE	8208±1437	9698±1821	8194±1261	7839±1190	<.001	.001	.001
	Control	6229±859	8911±1563	6805±1173	6814±1120			
bSBP (mmHg)	AE	112.9±9.0	130.1±13.6	117.6±11.5	114.27±9.3	<.001	.704	.043
	Control	110.3±8.2	131.6±12.0	116.4±10.7	114.7±9.5			
bDBP (mmHg)	AE	72.9±5.9	90.3±11.0	77.6±8.8	72.5±7.2	<.001	.817	.071
	Control	71.8±5.2	92.1±8.9	76.5±7.0	74.0±6.3			
cSBP (mmHg)	AE	97.6±7.6	117.4±15.2	103.1±11.6	98.5±7.9	<.001	.230	.014
	Control	96.7±7.3	123.1±16.4	102.9±10.0	100.0±9.1			
cDBP (mmHg)	AE	73.8±6.0	91.6±10.8	78.7±9.0	74.0±7.2	<.001	.931	.207
	Control	72.5±5.2	93.1±8.6	77.3±7.3	74.7±6.5			

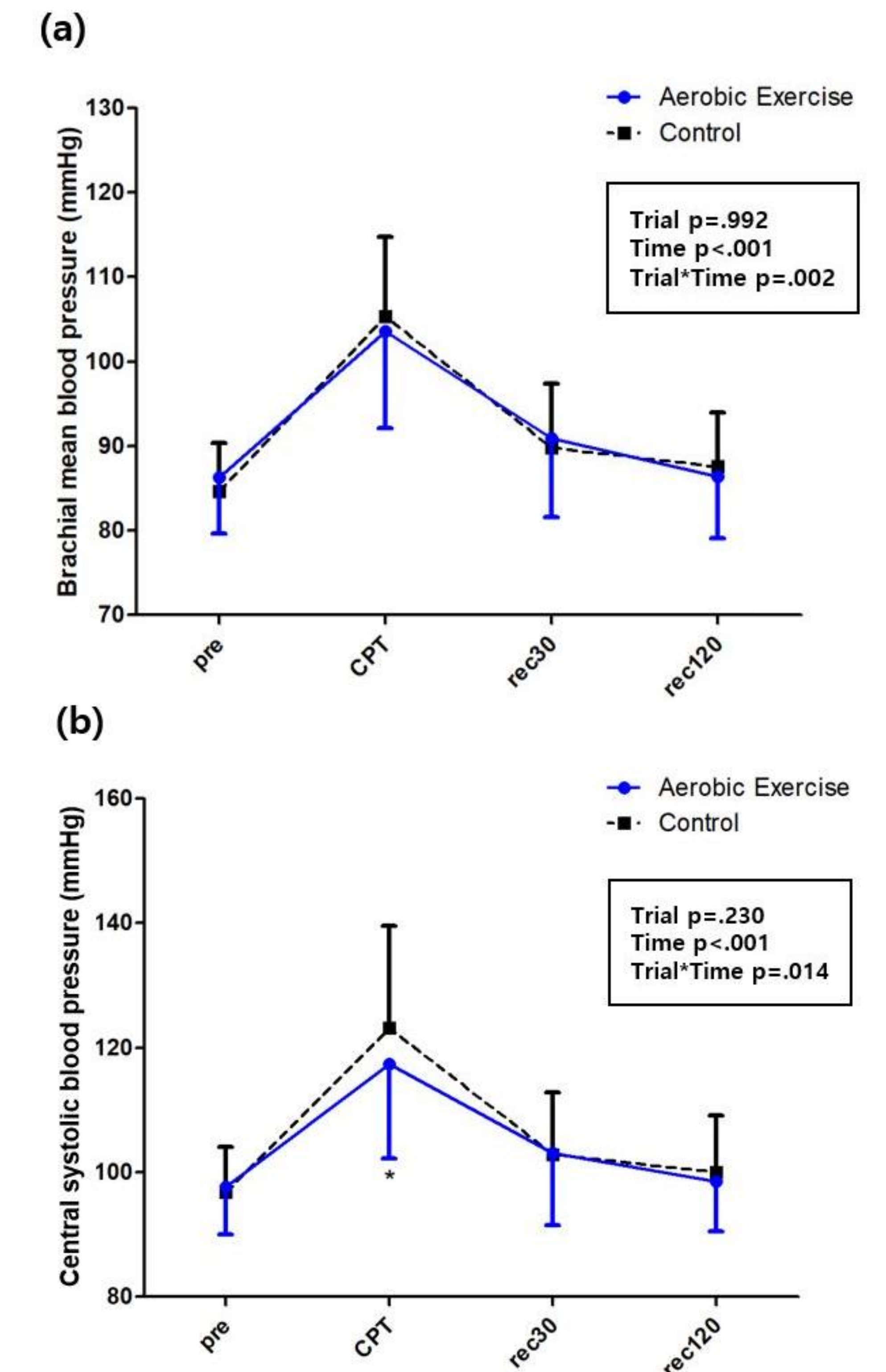


Figure 2. Effects of acute aerobic exercise on (a) bMAP and (b) CSBP during CPT and recovery

Conclusion

Acute aerobic exercise attenuated both brachial and central BPs reactivity to the CPT, suggesting that acute aerobic exercise may have a favorable effect on the pressor response to sympathetic activation in young adults.