A cool down period after a bout of dynamic exercise does not attenuate PEH in treadmill trained rats

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Post-exercise hypotension (PEH) is a well established phenomenon that occurs in a variety of exercise settings in humans and animals. PEH is characterized by increased vascular conductance and decreased cardiac output, which does not appear to be due to sympathetic withdrawal. It has been proposed that elimination of the muscle pump may contribute to PEH.

PURPOSE: Our aim was to determine if the fall in blood pressure after a bout of treadmill exercise could be attenuated or eliminated by continued low intensity walking. Thus, the purpose of the study was to test the hypothesis that continued low intensity exercise, a “cool-down period”, following a bout of dynamic exercise would attenuate the magnitude of PEH.

METHODS: Eight male Sprague-Dawley rats (350 ± 7 g) were previously trained 5 days/wk, for 2-4 wks on a motor-driven treadmill. Under isoflurane anesthesia the right carotid artery was catheterized. After two days recovery, blood pressure and heart rate were measured before, during and after a 20 min bout of running on a rodent treadmill at 20 m/min, 20% incline. On consecutive days, at the conclusion of the exercise bout, each rat either stopped exercise completely (no cool down, NCD) or continued walking at 5 m/min for 10 min before stopping (cool down, CD), as determined by random assignment.

RESULTS: Similar to previous reports, during the NCD protocol, blood pressure fell below the initial resting baseline (112 ± 3 mmHg) in all animals reaching its nadir between 20 and 30 min post-exercise (20 min, 104 ± 2 mmHg; 25 min, 104 ± 2 mmHg; 30 min, 104 ± 3 mmHg; p<0.05). PEH was not affected during the CD protocol, as blood pressure fell below baseline (109 ± 2 mmHg) to its nadir (30 min, 102 ± 3 mmHg; 35 min, 103 ± 3 mmHg; 40 min, 103 ± 3 mmHg; p<0.05). The time to maximum fall in blood pressure was delayed by the duration of the cool down period (to 30 min). Blood pressure remained elevated 10 min post-run during CD (112 ± 3 mmHg), while falling precipitously during the NCD (105 ± 3 mmHg; p=0.028).

CONCLUSIONS: These results suggest that, although a cool down period delays the immediate fall in blood pressure post-exercise, it does not attenuate the ultimate magnitude of PEH. These data suggest that at the conclusion of a protracted exercise bout, a period of low intensity exercise may diminish the potential for post-exercise syncope.

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