The Effect of Beetroot Juice Ingestion on Cardiorespiratory Responses to Exercise in Post-Myocardial Infarction Patients

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Purpose

Physical activity is the cornerstone of cardiac rehabilitation, yet poses a transient risk of ischaemia in post-myocardial infarction (MI) patients. Beetroot juice (BJ) improves exercise economy and blood pressure in apparently healthy individuals. Therefore the purpose of this study was to determine whether BJ might improve these measures in post-MI patients.

Methods

Six male post-MI patients (age 61.6 ± 9.5 years; weight 84.3 ± 7.1 kg; BMI 28.4 ± 3.7 kg·m2) provided informed consent to perform 3 sub-maximal cycle tests in a counterbalanced repeated measures design. The first trial involved familiarisation with the test and measurements which included measures of gas exchange and ventilation (VO2 & VE), blood pressure (BP), heart rate (HR), perceived exertion (RPE) and blood lactate ([La-]). These measurements were made at rest and whilst exercising on an electronically-braked cycle ergometer at 2.5 METs (low), 4.5 METs (moderate) and 2.5 METs (recovery). Rate-pressure product (RPP) and mean arterial pressure (MAP) were calculated. One of two solutions (2×7cL of BJ or Placebo) was ingested 2.5 hours prior to exercise in the subsequent experimental trials, which were separated by ≥7 days. Data are presented as mean difference ± SD and percentage change while magnitude based inference (MBI) was used to analyse the data due to the small sample size. Small and moderate MBIs were determined as ≥0.2 and ≥0.6, respectively.

Results

Compared to placebo, BJ decreased RPP (≥ -1436 ± 1878 bpm*mmHg; ≥ -11.8%; ≥0.65), MAP (≥ -5 ± 10 mmHg; ≥ -4.6%; ≥0.47), VO2 (≥ -0.3 ± 1.6 METs; ≥ -5.8%; ≥0.33) and [La-] (≥ -0.36 ± 1.00 mmol·L-1; ≥ -20.4%; ≥0.54) at low, moderate and recovery intensities. VE was reduced at 4.5 METs and during recovery (≥ -4.5 ± 19.5 L·min-1; ≥ -9.3%; ≥0.40) and RPE was reduced at 4.5 METs (-1 ± 2; ≥0.58). The greatest improvements were exhibited during the recovery period in: RPP (-2359 ± 3777 bpm*mmHg; -17.9%; 0.96), MAP (-12 ± 7 mmHg; -11.5%; 0.91), VO2 (-0.7 ± 1.5 METs; -14.9%; 0.85), [La-] (-0.99 ± 1.87 mmol·L-1; -35.5%; 0.65) and VE (-5.6 ± 16.5 L·min-1; -14.1%; 0.59).

Conclusion

These preliminary data suggest that beetroot juice may reduce cardiorespiratory stress in post-MI patients during exercise and in the immediate recovery period. However, further research is required to confirm this and the optimum BJ dose.