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The effects of a novel “fluid loading” strategy on the cardiovascular and haematological responses to orthostatic stress.

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Patients restricted to bed rest and astronauts exposed to microgravity experience large reductions in body mass (BM), total body water (TBW), plasma volume (PV) and skeletal muscle mass which can lead to orthostatic intolerance, and as yet there are no effective countermeasures. However, a novel fluid loading strategy combining creatine (Cr) and glycerol (Gly) results in a significant increase in BM, TBW and PV, which may attenuate some of the detrimental physiological effects of immobilisation..

PURPOSE: To examine the cardiovascular and haematological responses to orthostatic stress following supplementation with Cr and Gly. **METHODS:** 10 male subjects were subjected to 3 postural tilt tests designed to induce orthostatic stress, during which they lay supine for 30 min followed by a further 30 min in the 70° head up position. Following 2 baseline experimental trials, subjects ingested 20g Cr and 1 g Gly·kg⁻¹ BM per day for 7 days, flavoured with 200 ml diluting juice made up in 1 L of warm water. **RESULTS:** Tilting subjects from the supine position to 70° resulted in a significant mean increase in heart rate of 16 beats·min⁻¹ indicating a significant orthostatic challenge with no difference between experimental trials. During both baseline trials 3 subjects experienced hypotension and syncope during the 70° head up tilt phase. Following supplementation, BM increased (mean ± S.D.) by 0.9 ± 0.3 kg, TBW by 0.7 ± 0.2 L and PV by 3.2 ± 2.4%. Cr and Gly supplementation resulted in a significant mean increase in systolic (11 mmHg; *P*=0.02) and diastolic (7 mmHg; *P*=0.04) blood pressure during the tilt test and a reduced incidence of orthostatic hypotension and presyncope (1 subject). **CONCLUSION:** These data suggest that the expansion of body water compartments through Cr/Gly supplementation coupled with the purported anabolic properties of Cr may prove an effective countermeasure to combat orthostatic intolerance in patients exposed to prolonged periods of bed rest and astronauts following spaceflight.

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