PERIODIC UPRIGHT POSTURE NEGATES THE SUPPRESSION OF NOREADRENALINE RESPONSE TO HEAD DOWN BEDREST: C. E. Wade*, J. L. Evans, and D. O'Hara. Life Science Division, NASAAmes Research Center, Moffett Field, CA 94035.

INTRODUCTION. Head down bedrest (HDB) decreases plasma norepinephrine levels by placing a nadir within four hours. This decrease implies that the period of standing or exercise (+Gz) on this acute suppression of plasma norepinephrine. METHODS. Male subjects (mean±SD age 37±2 years; height 192±2 cm; weight 83±3 kg) were admitted to the Life Science Division of NASA-Ames Research Center, Moffett Field, CA 94035, USA, for one of four separate conditions: (a) a control protocol ("OGz") during four days of continuous bedrest. RESULTS. Control levels following 45-min supine were different between treatments. HDB suppressed plasma aldosterone (93.7±6.6±0.07 ng/dl) and NE levels (299±35 to 217±24 pg/ml). Plasma vasopressin (1.1±0.2 to 1.1±0.2 pg/ml), cortisol (11.1±1.4 to 9.3±0.7 µg/dl), E (69±15 to 65±21 pg/ml), and PRA (0.64±0.13 to 0.58±0.17 ngAI/ml/hr) were not significantly altered. Standing or exercise negated the decrease in aldosterone and NE levels due to HDB. CONCLUSIONS. Periodic upright posture (+Gz) with or without exercise for 15-min on each hour negates the acute suppression of aldosterone and NE associated with HDB.


The argument is not overwhelming for the need to provide a continuous 1Gz environment in order to maintain crew health in the space microgravity environment. Evidence over the years has suggested that somewhere between 0.1Gz and 1.5Gz might alter its effectiveness. Since acceleration level and duration are the optimal passive (or orthostatic tolerance) with a 60 day term space flight. METHODS. Nine subjects were subjected to four different +Gz exposure protocols plus a control protocol ("OGz") during four days of continuous bedrest. The results for the four +Gz exposures compared to the OGz control were 22.2% (P<0.05). RESULTS. Control levels following 45-min supine were not different between treatments. HDB suppressed plasma aldosterone (93.7±6.6±0.07 ng/dl) and NE levels (299±35 to 217±24 pg/ml). Plasma vasopressin (1.1±0.2 to 1.1±0.2 pg/ml), cortisol (11.1±1.4 to 9.3±0.7 µg/dl), E (69±15 to 65±21 pg/ml), and PRA (0.64±0.13 to 0.58±0.17 ngAI/ml/hr) were not significantly altered. Standing or exercise negated the decrease in aldosterone and NE levels due to HDB. CONCLUSIONS. Periodic upright posture (+Gz) with or without exercise for 15-min on each hour negates the acute suppression of aldosterone and NE associated with HDB.

N95-16780


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