Mitrai: Resurgluation as a cofactor in mitral valve prolapse


Aeromedical Evaluation Service, Brooks AFB, Texas 78490

ABSTRACT: Mitral regurgitation in the setting of mitral valve prolapse identifies a subset of individuals susceptible to mitral regurgitation. This subset is characterized by an increased prevalence of mitral valve prolapse. The purpose of this study was to determine whether gender affects red cell mass and plasma volume during a short exposure to simulated microgravity, and whether gender differences in orthostatic tolerance are present. Methods: Subjects were 12 nonshaking males between the ages of 35 and 50. After an 8-10 h fast, subjects ingested Cephaline® (20g solution) with a low-fiber breakfast on four different days (45, 30, 25, and 20) before BR and on three separate days (4, 7, and 10) during BR. Results: The combined effect of altered fluid shifts, fluid shifts, and disturbances associated with the absence of the gravity vector may decrease GIM during space flight. GIM can be estimated from the mouth-to-cocoon transit time (MCTT) of orally administered lactate (LAC); this test is used to assess changes in GIM in normal subjects and in patients with mitral valve prolapse and in patients with mitral valve prolapse and mitral valve regurgitation. The effect of ten days of BR on GIM was evaluated from the MCTT of LAC. Conclusions: The combined effect of altered fluid shifts, fluid shifts, and disturbances associated with the absence of the gravity vector may decrease GIM during space flight. GIM can be estimated from the mouth-to-cocoon transit time (MCTT) of orally administered lactate (LAC); this test is used to assess changes in GIM in normal subjects and in patients with mitral valve prolapse and in patients with mitral valve prolapse and mitral valve regurgitation. The effect of ten days of BR on GIM was evaluated from the MCTT of LAC.

N95-16752

N95-16753


INTRODUCTION: Changes in blood volume during space flight are thought to contribute to decrements in cardiovascular function and orthostatic tolerance function. The purpose of this study was to determine whether gender affects red cell mass and plasma volume during a short exposure to simulated microgravity, and whether gender differences in orthostatic tolerance are present. Methods: Subjects were 12 nonshaking males between the ages of 35 and 50. After an 8-10 h fast, subjects ingested Cephaline® (20g solution) with a low-fiber breakfast on four different days (45, 30, 25, and 20) before BR and on three separate days (4, 7, and 10) during BR. Results: Plasma volume (PV) and red cell mass (RCM) decreased (P < 0.01) during bedrest in both groups, with a greater PV decrease (P < 0.05) in men (6.3 ± 0.6 ml/kg) than in women (4.1 ± 0.6 ml/kg). Decreases in red cell mass were similar (1.7 ± 0.2 ml/kg) in men and 1.7 ± 0.2 ml/kg in women. OT was similar for men and women before bedrest (-7.6 ± 2.6 mmHg in men and -7.0 ± 4.3 mmHg in women) and decreased by a similar degree (by an average of 11 mmHg in both groups) after bedrest. The changes in OT did not correlate with changes in plasma volume during bedrest (P = 0.02). Conclusions: Although female hormones may protect PV during bedrest, they do not appear to offer an advantage in terms of loss of orthostatic function.

EFFECT OF ANTIORTHOSTATIC BEDREST (BR) ON GASTROINTESTINAL MOTILITY OF NORMAL SUBJECTS. E. Patchell*1, R. P. Heister1, K. J. Tietze1, and N. M. Cintino1. NASA Medical Operations Branch, NASA/Johnson Space Center, Houston, TX, KRG Life Sciences, Inc., Houston, TX and Philadelphia College of Pharmacy and Science, Philadelphia, PA

INTRODUCTION: The combined effect of altered fluid shifts, fluid shifts, and disturbances associated with the absence of the gravity vector may decrease GIM during space flight. GIM can be estimated from the mouth-to-cocoon transit time (MCTT) of orally administered lactate (LAC); this test is used to assess changes in GIM in normal subjects and in patients with mitral valve prolapse and in patients with mitral valve prolapse and mitral valve regurgitation. The effect of ten days of BR on GIM was evaluated from the MCTT of LAC. Methods: Subjects were 12 nonshaking males between the ages of 35 and 50. After an 8-10 h fast, subjects ingested Cephaline® (20g solution) with a low-fiber breakfast on four different days (45, 30, 25, and 20) before BR and on three separate days (4, 7, and 10) during BR. Results: PV and RCM concentrations were measured before and at 10-min intervals for 4 h after breakfast using a Quinton biofeedback system. MCTT was determined from these data. Results: MCTT ranged between 50 and 100 min during adlib consumption and 80 and 210 min during BR with means of 79 min and 122 min, respectively. Conclusions: MCTTT during BR was 54% longer than during adlib consumption, suggesting that absorption and availability of orally administered medications and nutrients may be delayed or impaired as a result of decreased GIM during bedrest.

THE EFFECTS OF LYPRESSIN ON HEMODYNAMIC RESPONSES TO HEAD-DOWN TILT AND ORTHOSTATIC STRESS. D. F. Ward* and R. W. Gansett*. Wright State University School of Medicine, Dayton, OH 45401.

INTRODUCTION. This study was conducted to examine the effects of the synthetic drug lysine-8-vasopressin (lypressin) on specific hemodynamic variables during an acute (4 h) head-down tilt (HDT) and subsequent orthostatic stress. Methods. Seven healthy male subjects, ages 23-27 y, were studied in a blinded, crossed-over study of lypressin versus the control, normal saline mist spray, administered intranasally immediately before and two hours after beginning a 6 day head-down tilt. Plasma volume, urine flow and cardiovascular dynamics were assessed by venous hemoglobin/hematocrit, radioisotopic indicators, volumes of distribution, electrocardiography, impedance cardiography and plethysmography measurements before, during, after tilt, and in response to a 4-minute stand test. Results. In the lypressin trial, stroke volume, cardiac output and index, and pulse pressure were significantly decreased (p<0.05) while total peripheral resistance was increased at the end of tilt. Plasma volume changes showed a significant increase of 5.9% by the end of tilt in the lypressin trial (p<0.001) while there was no significant change. Clinical observations included pre-syncope symptoms in three of the seven control subjects versus none of the lypressin trial subjects during post-tilt standing test. Post-tilt standing test showed arterial pressure was maintained at a higher value in the lypressin trial compared to baseline stand test. The pulse time index and cardiovascular index of deconditioning showed a significant increase for placebo subjects after tilt and no change for those pre-tilt with lypressin subjects. Conclusions. The cardiovascular system adapts to a new steady-state during 4 hours HDT that is maladaptive when provoked with orthostatic stressors. Exogenous vasopressin analogue ameliorates the deleterious effects of post-tilt standing test by maintaining the intravascular volume at greater than pre-tilt values and increasing mean arterial pressure via peripheral resistance.
EFFECT OF LNP ON CEREBRAL CIRCULATION

T. Uno, T. Yashimoto, T. Hayama, S. Sekiguchi, S. Yonakura, A. Myamoto, and T. Fujita. Department of Neurosurgery, Tokyo Police Hospital, Fujimi 2-18-41, Chiyoda-ku, Tokyo 102, Japan. Dept. of Hygiene, Nihon Univ. School of Medicine, and National Space Agency, Japan.

INTRODUCTION: The purpose of our study is to determine the effects of lower body negative pressure (LNP) on cerebral circulation. Measured oxygenation and hemodynamics of the brain were measured continuously and noninvasively in eight cases who were exposed to 30mm Hg LNP for 25min by using a carotid doppler, a transtemporal doppler, a cuanine laser doppler, and a near-infrared spectrophotometry. RESULTS: The carotid blood flow and the mean velocity of the middle cerebral artery decreased in all cases even though the systemic blood pressures were well maintained. Oxygenated hemoglobin and cerebral blood volume of the brain typically increased while deoxygenated hemoglobin showed variable small changes. CONCLUSION: The effects of the carotid doppler on the transtemporal doppler indicate that the cerebral blood flow might decrease during LNP. From the increase of oxygenated hemoglobin and cerebral blood volume, it is suggested that the dilatation of the cerebral vessels occur at the arterial side. Taken together, it can be said that exposure to moderate LNP typically produces a decrease of the cerebral blood flow with a compensatory vasodilatation of the arterial side of the brain.

HEMODYNAMIC RESPONSES OF THE SWINE TO G-SUIT INFLATION, THE AGS AND PRESSURE BREATHING DURING +Gz (PHIL). J. Burnet, W. Fanton and J. Jernigan. CWRW Technology and Veterinary Sciences Divisions, Armstrong Laboratory, Brooks AFB, TX 78235-5000.

INTRODUCTION: The g-protective benefits of FBs have been well demonstrated. A swine model has been developed to investigate the physiologic bases for these benefits. METHODS: A mask and a chest counterpressure g-suit was used for application of FBs to the swine. g-suit protection was supplied by an extended coverage suit which provided nearly complete body coverage caudal to the rib cage. RESULTS: In the first 5 g of +Gz exposure, ear opacity and ear opacity pulse amplitude decreased. The decrease was more marked at increased +Gz levels. Cardiovascular compensation occurred over the next 5 s which increased opacity and opacity pulse. For the remainder of the 2 min exposure, ear opacity and ear opacity pulse increased with a mean cycling period of 10.4 s. The mean difference in the opacity values within cycles was 17.1% of the +Gz opacity value. CONCLUSIONS: These results suggest that in a本文, cardiac function during LBNP is decreased. A Multi-Wire Gamma Camera following an intravenous bolus injection of 30-50 mCi of technetium 99m-mercaptoacetyltriglycine was used to examine cerebral blood flow during LBNP, heart rate increased (P<0.01) from 67 bpm to 99 bpm, systolic blood pressure decreased (P<0.01) from 119 mm Hg to 93 mm Hg, and left ventricular ejection fraction (EF) decreased (P<0.01) from 0.57 to 0.50. During LBNP, ST segment depression of at least 0.5 mm occurred in almost every case. Oxygenated hemoglobin and deoxygenated hemoglobin decreased during LBNP. From the increase of oxygenated hemoglobin to the arterial side, it can be said that exposure to moderate LBNP typically produces a decrease of the cerebral blood flow with a compensatory vasodilatation of the arterial side of the brain.