ASPECIFIC NASAL HYPERREACTIVITY IN AN AIR FORCE POPULATION AND ITS RELATIONSHIP WITH BRONCHIAL HYPERREACTIVITY. L. Urbaniai, R. Bertil, C. De Angelis, G. Petrelli, S. Farcace, P.M. Mattiochio, R. Misini and F. Filiaci. IAF, DAGS, Dept. of aerospace Medicine and ENT Clinic, University of Rome.

INTRODUCTION. Nasal function is of paramount importance for aircrew. Aspecific nasal hyperreactivity (ANH) prevalence in a young Air force population was investigated and compared to the prevalence of aspecific bronchial hyperreactivity (ABH) and atopy. The study was performed in a daylight period, using nasal provocation tests (NPTs). ANH was evaluated by methacholine NPT, by measurement of nasal secretions. A provocation tests (NPTs). CONCLUSION. In this group of 159 aviators with NM only and NPTs performed, ANH was significantly more common in subjects with NM and ANH was significantly more common in subjects with NM as compared with the group without ANH. ANH may be an important factor in the selection of aircrew.

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

INTRODUCTION. This study was conducted to determine the effects of the synthetic drug lysine-8-vasopressin (lyypressin) on specific hemodynamic variables during nascent (4 hours) head-down tilt (HDT) and subsequent orthostatic stress. METHODS. Seven healthy male subjects, ages 23-45, were exposed to a blind, cross-over study of lysypressin versus the control, normal saline. Baseline blood pressure and heart rate were measured after a 30 min seated rest. Subjects were then exposed to a 45 degrees head-down tilt for 4 h, administered intranasally immediately before and two hours after beginning a 6 h cross-over study. Tilt in the lypressin trial (p<0.005), while in the placebo group vs. the control (p<0.05). Treatment with lysypressin significantly increased mean arterial pressure and decreased heart rate during the initial 2 h of exposure.

VASCULAR RESPONSES TO THE INTRAVENOUS INJECTION OF L-ARGININE IN HUMAN PATIENTS WITH SEVERE AND MILD ARTERIAL DISEASE. P. Kastrup, B. Halle, J. Brocken, H. Borch, M. Pedersen, and J. H. Buchs. Department of Internal Medicine, Aarhus University Hospital, Aarhus, Denmark.

INTRODUCTION. The role of endothelium-derived nitric oxide (NO) in the pathogenesis of peripheral arterial disease (PAD) is controversial. This study was conducted to determine whether the intravenous injection of L-arginine, a NO precursor, increases NO bioavailability in patients with severe PAD. METHODS. The study included 10 patients with severe PAD (70-100% diameter stenosis) and 10 patients with mild PAD (50-70% diameter stenosis). The patients received a bolus injection of L-arginine (50 mg) followed by an infusion of L-arginine (150 mg/min) for 10 min. Results were compared with those in eight healthy controls who received placebo. RESULTS. The intravenous injection of L-arginine increased forearm blood flow by 20% in patients with severe PAD and by 10% in patients with mild PAD, compared to placebo. The increase in forearm blood flow was accompanied by a dose-dependent increase in forearm brachial artery diameter and a decrease in systolic blood pressure. Conclusion. The intravenous injection of L-arginine increased NO bioavailability in patients with severe PAD, but not in patients with mild PAD.
DOBUTAMINE, A BETA AGONIST, REDUCES MUSCLE AND BONE LOSS IN DENERVATED HINDLIMBS. M. L. Walker, K. Prater, R. Herr, S. Whitnanger and B. G. Wright. Wright State University, Dayton, OH 45435

INTRODUCTION. Hindlimb denervation produces alterations in skeletal muscle and bone similar to those observed in animals exposed to microgravity. The objective of this experiment was to determine the effects of dobutamine, a synthetic catecholamine and beta agonist, could effectively attenuate bone and muscle changes induced by 12 days of hindlimb denervation. METHODS. Adult male Sprague-Dawley rats (n=14) underwent unilateral sciatic nerve section on the right hindlimb. After surgery rats were randomly assigned to either control saline (SAL) or DOB treatment groups. Each animal received two intraperitoneal injections per day, given approximately one hour apart, for 11 of the 12 days. Tissues were studied at the proximal level (PH) and the IB (15mm) of the tibia from both the innervated (INN) and denervated (DENERV) hindlimbs of each rat were measured by a bone densitometer (SF 2 Lunar). Muscle weights of the soleus (SOL) and plantaris (PLT), and citrate synthase (CS) enzyme levels of the SOL muscle were examined.

RESULTS. ANOVA and Tukey’s post hoc tests (p<0.05) indicated a significant reduction in wet weight of the SOL and PLT muscles in the DENERV SAL group when compared with their INNERV hindlimb counterparts. BMC of the PH and PH of the ibia and CS levels of the SOL were also significantly reduced in the DENERV animals that received SAL. Although animals which received DOB treatment did have decreases in muscle mass, BMC and CS in the DENERV hindlimb, these decreases were not significant when tested against their INNERV values. DOB treatment appeared to be most effective in bone, where the decrease in BMC produced by DENERV in SAL animals was almost entirely eliminated in rats receiving the drug. CONCLUSION. These data indicate that DOB is able to effectively attenuate alterations in muscle and bone which are induced by hindlimb denervation. This information suggests that DOB may be effective as a countermeasure for some of the deconditioning like changes which result from exposure to a microgravity environment.

N95- 16754

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CHANGES IN LEFT VENTRICULAR FUNCTION AS DETERMINED BY THE MULTI-WIPE GAMMA CAMERA AT NEAR PRE-SYNCOPTAL LEVELS OF LOWER BODY NEGATIVE PRESSURE.

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At presyncopal levels of lower body negative pressure (LBNP), we have frequently observed cardiovascular respiratory changes due to the altered cardiac position and/or shape, but could be indicative of altered myocardial function. To further investigate this, we evaluated cardiac function using a nuclear imaging technique in 6 young subjects at 2 levels of 30 min supine rest and near the end of a presyncopal limited LBNP exposure (LBNP averaged 65 ± 3 mmHg at injection). Cardiac function changes were obtained using a Multi-Wipe Gamma Camera following an intravenous bolus injection of 30-50 millicurries of TcTatantum. Manual blood pressures and electrocardiograms were obtained throughout the 3-minute graded LBNP protocol. Between rest injection during LBNP, heart rate increased (P<0.001) from 67 ± 3 bpm to 99 ± ppm, systolic blood pressure decreased (P=0.011) from 119 ± 3 mm Hg to 107 ± 3 mm Hg and left ventricular ejection fraction (EF) decreased (P<0.001) from 0.48 ± 0.02 to 0.48 ± 0.02. During LBNP, ST segment depression of at least 0.5 mm occurred in 7 subjects. Subjects with ST segment depression had greater reductions (P=0.05) in EF than subjects without ST depression (0.15 ± 0.07 vs. 0.05 ± 0.03), but also tolerated greater levels (P=0.05) of negative pressure (88 ± 5 mm Hg vs. 69 ± 5 mm Hg). There was a significant relationship between presyncopal LBNP levels and EF (E= 0.50 ± 0.05). These findings suggest there may be a decrease in systolic myocardial function at high levels of LBNP.

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EFFECT OF LBNP ON CEREBRAL CIRCULATION

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INTRODUCTION. The purpose of our study is to determine the effects of lower blood pressure (LBNP) on cerebral circulation. METHOD. Oxygen and hemodynamics of the brain were measured continuously and noninvasively in eight cases who were exposed to 30mmHg LBNP for 25min by using a carotid doppler, a transcranial doppler, a coumarine laser doppler, and a near infrared spectrophotometry. RESULTS. The carotid blood flow and the mean velocity of the middle cerebral artery decreased in almost cases even though the systolic blood pressures were well maintained. Oxygenation of hemoglobin and cerebral blood volume of the brain typically increased while deoxygenated hemoglobin showed variable small changes. CONCLUSION. These results of the carotid doppler and the transcranial doppler indicate that the cerebral blood flow might decrease during LBNP. The increase of deoxygenated hemoglobin and cerebral blood volume, it is suggested that the dilatation of the cerebral vessels occurs at the arterial side. Taken together, it can be said that exposure to moderate LBNP typically produces a decrease of the cerebral blood flow with a compensatory vasodilatation at the arterial side of the brain.

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INTRODUCTION. The g-protective benefits of PbG have been well demonstrated. A swine model has been developed to investigate the physiological basis for these benefits. METHODS. A mask and a chest counterpressure garment have been designed for application of PbG to the swine. G-suit protection was supplied by an extended coverage suit which provided nearly complete body coverage caudal to the rib cage, left and right ventricular pressure, left and right ventricular stroke volume (SV) and cardiac output (CO), aortic pressure, eye-level blood pressure (ELBP), heart rate (HR), central venous pressure, esophageal pressure, mask pressure, and G-suit pressure were measured during +Gz with and without PbG and during +Gz without +Gz. RESULTS. During a 15 sec exposure to a 5-55 +Gz (6 +Gz) PbG suit was maintained above 55 mmHg without PbG and above 70 mmHg with PbG by an increase in total peripheral resistance, even though SV, CO and PbG decreased by 57%, 65% and 5% respectively, with PbG. The reduction of G-suit inflation, the AGSH and PbG during +Gz resulted in significantly increased intravascular pressures. However, a similar increase in intrathoracic pressure was not observed. CONCLUSIONS. Elevated ELBP with PbG compared to without PbG supports the finding of an extended time at +Gz and a reduction in the physical effort to maintain vision during sustained +Gz.