APoPROTIN B AS A USEFUL TOOL TO FORETstellar CARDIO-VESTARIAL RISK IN

INTRODUCTION. It is generally accepted that apo B levels as a reliable predictor of cardiovascular risk disregarding pathological antecedents. This paper presents the results of a study that measured cholesterol, apo A and apo B plasma levels in otherwise healthy ground and flight workers sample. METHODS: Total cholesterol was determined by Abbott's hexokinase method and apo A and B by Behring's nephelometric method in 396 random workers sample. RESULTS: 35.4% males and 13.4% females were hypercholesterolemic, being 75% and 68% respectively considered high cholesterol risk. 11% males and 4% females with normal cholesterol were also considered high risk, due to high apo B and low apo A levels. CONCLUSIONS: AProtin B should be determined in hyper and/or hypercholesterolemic workers when there are other associated factors (smoking, hypertension, diabetes) and/or safety related jobs (aircrew) in order to comply or not harsher therapies to prevent cardiovascular disease.

REGULATION AND ADAPTATION PROCESSES OF HUMAN BODY IN LONG-TERM MICROGRAVITY. A.I. Grigorov and A.D. Egorov, Institute of Biomedical Problems, Moscow 123070, USSR.

INTRODUCTION. Mechanisms of regulation and adaptation of cardiovascular, respiratory, muscular-skeletal, hematologic and immune systems in microgravity are discussed in this paper. METHODS: Space flight medical investigation results are analyzed and summarized in terms of general physiological mechanisms. RESULTS: Microgravity-induced elimination of gravity-related deformations and tissue mechanical tension of the human body structures changes after input and removes weight-load and hydrospace blood pressure. As a result, regulation processes are changed and short- and long-term adaptation responses are developed. It was shown, that structural changes are result in adaptive rearrangement of the functional state of the main body systems. The fluid shifts are accompanied by reflux changes in circulation, water-salt metabolism and kidney function. The relaxation of load upon the human body weight-bearing structures results in partial loss of properties and qualities, acquired by man under influence of the Earth's gravity, and causes changes in intensity of the oxidative processes, structure plastic and transport support of a number of body functions. CONCLUSIONS: The human body adaptation processes which occur in microgravity result in the involving of the self control and adaptive mechanisms, which in combination with the countermasures complex, prevents further progression of disorders and to certain extent smoothes them.


INTRODUCTION. Bone loss following spaceflight is well documented, and if left unattended, this may lead to osteoporosis with significant muscle atrophy accompanied by reduced muscle strength and fatigue resistance. The objective of this study was to determine decrements in muscle size, if any, in the soleus and gastrocnemius muscles of male and female astronauts after 9 days of space flights. METHODS: Eight astronauts, one female and seven male, between the ages of 31 and 59 years, 59-86 Kg in body weight were examined by MRI 2-3 times preflight within 16 days before launch; and 2 days (n=8) and seven days (n=8) after landing. The right leg muscles (gastrosoleus) were imaged with a lower extremity coil in magnet operating at 1.5 T. The imaging protocol consisted of spin echo with a TR of 70-1.5 sec. Thirty to forty 3-5 mm thick slices were acquired in 256 x 128 or 256 x 256 matrices. Acquisition time lasted 20-40 minutes. Multiple slices were measured by manual planimetry. RESULTS: Compared to the preflight, the cross-sectional areas (CSA) of the soleus, gastrocnemius and the leg, at 2 days after landing were reduced (at least P<0.05) 8.9 percent, 10.2 percent and 8.5 percent, respectively. The soleus and the leg of three astronauts evaluated at 7 days postflight, did not show full recovery compared to the preflight values. CONCLUSIONS: It is concluded that 9 days of space flight may cause significant decrease in CSA of the leg muscles. The factors responsible for this loss need further delineation.


INTRODUCTION. The USSR experience, having been accumulated in LDSF medical support, has shown the necessity of the definite correction and specification of methodology of MCS design. METHODS: By use of systemic analysis a generalized estimation of the results of MCS in space has been performed. The harmonic correction was evaluated. The results of examination of 19 Soviet cosmonauts, who performed LDSF, lasting from 2 to 12 months, in 1986-90, were analyzed. The analogous estimation has been carried out in 556 experiments with volunteers during the modelling of zero-gravity environment. RESULTS: The systemic analysis has shown, that in addition to 3 well-known methodological principles (i.e. pathogenesis, "MC by stages" and succession's ones), 4 new principles must be formulated and taken into account. They are the systemic-structural approach, the determinism of the infrastructure of the basic physiologic module, the notion of total "image" of MCS, the search of "organ-targets." CONCLUSION. The realization of the described methodological principles leads to the significant improvement of the informative and diagnostic possibilities of on-board MCS in LDSF.

RESULTS OF AN INTERNATIONAL SPACE CREW DEBRIEF. P.A. Santy*, A.K. Hollen*, L. Souper* and R. Morwood-North*. UTMB, Galveston, TX 77550; and Johnson Space Center Biobehavioral Laboratory, Houston, TX 77058.

INTRODUCTION. In order to identify potential multicultural and multilingual problems for future international Space Station Freedom crew, a crew debrief questionnaire (called an "International Crew Debrief") was developed for U.S. astronauts who flew on Shuttle missions with one or more crewmembers from other countries. METHODS. From 1988-90, a total of 20 U.S. astronauts flew on International space missions. Debriefs were mailed to all twenty with instructions not to identify themselves or their specific mission. The debrief focused primarily on preflight training; and postflight mission events, microenvironment problems, miscommunication, and interpersonal friction among crewmembers. Astronauts were also asked to rate the impact of the incident to the mission (low, medium or high). RESULTS. Most of the astronauts responded, but only nine responses were able to be scored; for a return rate of 45%. 42 incidents were reported: 9 in the preflight period; 26 inflight; and 7 in the postflight period. Most of these incidents were low or medium impact, but 5 of the inflight incidents were rated at a "high" mission impact. A number of causes for the problems were listed, and are discussed. CONCLUSIONS. The Debrief respondents provide useful and timely recommendations on preflight training which might help facilitate the integration of multinational crews and prevent multicultural or multilingual factors from interfering with mission operations.

INTRODUCTION. In addition to the high terrestrial altitudes associated with physical and psychological decrements, relevant aeromedical guidelines for aircrew management are lacking. METHODS. Thirteen male subjects ascended in 10 minutes from SL to 4300 m (simulated), and returned to SL the following day for 2.5 days. Four times per day subjects completed tests assessing vigilance, coordination, cognitive performance, and mood with repeated measures. RESULTS. Transient deficits were seen on altitude day 1 for 3 cognitive tasks. Most tasks displayed a strong and persistent learning effect. Subjects reporting AMS demonstrated consistently slower rates of learning and negative changes in mood compared to well subjects. Altitude day 1, oxygen administration improved performance on 2 cognitive tests and on mood scale. CONCLUSIONS. Following rapid ascent to 4300 m, performance is most affected during the first several hours. After a period of acclimatization, oxygen may not be necessary for ground duties. However, the cognitive and mood effects of AMS, combined with the well-known physical symptoms, suggest that altitude oxygen should not fly.


INTRODUCTION. The aim of this study is to compare the circadian rhythm of plasma cortisol levels following a 3 day stay and an East-West and Southbound return flight from Tokyo, Paris, San Francisco (SFO) and Sydney to Tokyo. METHODS. Six healthy male volunteers were recruited for the project. Plasma cortisol levels were monitored 4 times (3am, 7am, 15pm and 23pm) daily for 13 days during the experimental period. RESULTS. In Tokyo, the baseline pattern of cortisol concentrations showed the classical diurnal profile with the values ranging from 2.3 ug/dl (3am) to 12.2 ug/dl (7am). During the 3 daystay East-Westbound flight, disappearance of circadian rhythm (Paris) or phase advancement of 8 hours (SFO) were observed. After returning to Tokyo, the subjects exhibited the original diurnal pattern beginning Day 1, however, complete resynchronization was not apparent until Day 2 (Paris) or Day 4 (SFO). In contrast, circadian rhythm was not disturbed by the Southbound flight to Sydney with one hour time difference. CONCLUSION. The data demonstrated that the circadian rhythm of cortisol changes during trans-continental flights. This tool can be used as a means to optimize flight schedule for cockpit crews.


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THE SURGICAL PATHOLOGIST: A RESOURCE IN THE FLIGHT DOCTOR'S MANAGEMENT OF FLYING PERSONNEL WITH NEOPLASMS. D. R. Drachkovitch, Wilford Hall USAF Medical Center, Lackland AFB, Texas 78236.

Major gains in rates of cure and/or long term survival of patients with neoplasms have been made in the past 20 years. Increasing numbers of Air Force flying personnel are requesting waivers to return to flying status after treatment for a variety of neoplasms. The surgical pathologist, by his role in diagnosing neoplasms and assessing response to therapy, is an important source of information for flight surgeons managing patients with neoplasms. Wilford Hall USAF Medical Center is a major referral center for flying personnel with neoplasms. The surgical pathologist, by his role in diagnosing neoplasms and assessing response to therapy, is an important source of information for flight surgeons managing patients with neoplasms. Wilford Hall USAF Medical Center is a major referral center for flying personnel with neoplasms.

In conclusion, the surgical pathologist is an important source of information for flight surgeons managing patients with neoplasms. Wilford Hall USAF Medical Center is a major referral center for flying personnel with neoplasms.
AIRPORT DISASTER PLAN IN TOKYO INTERNATIONAL AIRPORT

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ABSTRACT. It has been already reported in number of studies that about 85% of aircraft accidents occurred within 5 miles from airport. For this reason, it is important to have a disaster plan in cooperation with the various agencies concerned. This paper describes the efforts to complete the plan in April 1991. RESULT. First report: ICAO 1980 that 85% of aircraft accidents occurred within 5 miles from airport. For this reason, it is described in the Airport Emergency Plan of the Airport Service Manual.

NEUROPSYCHOLOGICAL ASSESSMENT OF AVIATORS: A COMPARISON OF TRADITIONAL AND COMPUTER-BASED APPROACHES. G. Kar Georgetown University School of Medicine, Washington, D.C.* J.R. Hendricks, E. Pakal, Federal Aviation Administration, Washington, D.C.

INTRODUCTION. Aviators generally require neuropsychological assessment when there is evidence of neurological or psychiatric conditions, or when there is evidence of deterioration in their performance. COGSCREEN, a computerized cognitive screening test, in development by FAA, is being selectively applied as an adjunct tool during such revalidations. METHODS. Nine commercial aviators (7 Pilots and 2 Flight Engineers) who had been referred for neuropsychological assessment were administered a traditional Halstead-Reitan battery of cognitive screening tests. COGSCREEN computerized test battery (45 minutes). Results from COGSCREEN were compared with FAA's current standard commercial pilot normative database (N = 440). Results: Two of the three pilots who had failed traditional testing scored below the 5th percentile on multiple measures from COGSCREEN. Only one of the three pilots who had failed traditional testing scored below the 5th percentile on multiple measures from COGSCREEN. Conclusion: COGSCREEN appears to have the potential to detect subtle cognitive deficits in commercial pilots. COGSCREEN appears to have the potential to detect subtle cognitive deficits in commercial pilots. COGSCREEN appears to have the potential to detect subtle cognitive deficits in commercial pilots. COGSCREEN appears to have the potential to detect subtle cognitive deficits in commercial pilots. COGSCREEN appears to have the potential to detect subtle cognitive deficits in commercial pilots.
VERY LOW PREVALENCE RATE OF NIDDM AMONG COCKPIT CREWS OF JAPAN AIRLINES. Y. Shibata, C. Yamada, N. Tsuchiya, I. Terasawa, K. Ueda, N. Takada, P. Maeda, J. Yokoyama, M. Ohno, Y. Noruchi, M. Hokari. Flight Crew Medical Service Department, Japan Airlines, Tokyo, Japan.

INTRODUCTION. The present study was conducted to evaluate the prevalence of NIDDM among cockpit crews to analyze the present status of individuals with NIDDM and impaired glucose tolerance (IGT).

METHODS. A total of 1263 active crews ranging 40-60 yrs are included in this study. All received annual medical examination every 6 month since employment and those who showed urine glucose > trace and/or fasting plasma glucose (FPG) > 100 mg/dl took 75gOGTT. Of 285 subjects who was confirmed of index of 3-31-91, laboratory variables were measured to determine their control status. RESULTS. Of 1263, 43 were diagnosed as NIDDM, 192 as IGT, 10 as renal glucoseuria and the remaining 1018 were normal. Prevalence rate of NIDDM was 3.4%. A cross sectional study demonstrated that present age (52.8, 49.2 vs 46.8 yrs), FPG (107, 104 vs 92 mg/dl), HbA1c (6.1, 5.8 vs 5.5%) were higher in NIDDM and IGT than in normals, however, BMI, T.chol and uric acid levels were identical among three groups. None of them were grounded due to poor control of diabetes. CONCLUSION. The occurrence of NIDDM among cockpit crews was approximately 1/3 of general population despite the possibility of high risk of diabetes. The factor cannot be neglected, however, intensive supervision by us seems to be effective to ameliorate their glycemic control.

INTRODUCTION. In efforts to enhance a high performance fighter pilot's tolerance of high sustained Gz (HSG), centrifuge training in which the subject undergoes series of runs attaining a maximum of 70 for 15s are commonly employed with minor if any complications. This paper, however, describes just such a routine centrifuge strategy session resulting in the fracture of the subject's femoral neck. Thorough search of the literature revealed no similar incident of injury. CASE REPORT. A 30-year-old Air National Guard pilot in good health (no history of lower extremity injury or pathology or change in activity) was approved for centrifuge training at a military training facility. In a rapid onset run (100) of high Gz, he was accelerated from 1.2G to 7.0G at a rate of +2.0 G/s, sustaining 7.0Gz for an additional 15s while performing the M-1 maneuver. At the completion of this run, the patient reported numb pain in his right hip. Examination revealed a complete fracture of the right femoral neck with no concomitant pathology. Initial biomechanical assessment of possible causative factors suggests that a minor shift in seating during the rapid onset of G's may have channelled enough force through the hip to exceed bone strength. IMPLICATIONS. With thorough biomechanical analysis, the possible etiologic factors of this unique case will be demarked, furthering our understanding of human function under high-G stress, and hopefully preventing future occurrence of such injury.

INTRODUCTION. Injections from jet aircraft have been an area that has been exhaustively studied from many perspectives, e.g. causes of ejection, types and causes of ejection injuries, etc. Curiously, no study has been found concerning the fate of eyewear in ejections. Many pilots are required to wear corrective lenses during flight ops and may wear sunglasses. What happens to these during ejection? What injuries are caused? What factors can be identified that influence retention rate and severity of related injury? Do contact lenses provide significant advantage? METHODS. 10 pilots were tested at 15G +Gz using a 700kg aircraft, flying from 17T to '90 involving corrective or sun lens use were retrospectively examined. 5 were contact lens wearers. Most information was obtained from HAFSC records and some from personal questionnaires. Injury and retention rates were examined as functions of several variables. RESULTS. Though 39 of 46 lost all lenses every single instance of retention occurred with visor down, G2 mask on, helmet properly secured, and at lower ejection speeds. Related injuries were minor and occurred in only 20%. CONCLUSION. The utility of and need for enforcement of standard operating procedures (i.e. mask on, helmet, secured, and visor down) was clearly demonstrated. Only 19 of 46 clearly met all three criteria. Contact lens users were too few to draw meaningful conclusions.

INTRODUCTION. As tactical aviation moves far beyond into the RTEF of MANNED VEHICLES. J.E. Lyman, M.D. NASA Johnson Space Center, Biomedical Laboratory, Houston, TX 77058; J. F. Fanning, P. L. Gage, Texas Tech University Health Sciences Center, Biomechanics Laboratory, El Paso, TX 79905.

INTRODUCTION. Flight testing a tolerance of high sustained Gs (HSG), centrifuge training in which the subject undergoes a series of runs attaining a maximum of 70 for 15s are commonly employed with minor if any complications. This paper, however, describes just such a routine training strategy session resulting in the fracture of the subject's femoral neck. Thorough search of the literature revealed no similar incident of injury. CASE REPORT. A 30-year-old Air National Guard pilot in good health (no history of lower extremity injury or pathology or change in activity) was approved for centrifuge training at a military training facility. In a rapid onset run (100) of high Gz, he was accelerated from 1.2G to 7.0G at a rate of +2.0 G/s, sustaining 7.0Gz for an additional 15s while performing the M-1 maneuver. At the completion of this run, the patient reported numb pain in his right hip. Examination revealed a complete fracture of the right femoral neck with no concomitant pathology. Initial biomechanical assessment of possible causative factors suggests that a minor shift in seating during the rapid onset of Gs may have channelled enough force through the hip to exceed bone strength. IMPLICATIONS. With thorough biomechanical analysis, the possible etiologic factors of this unique case will be demarked, furthering our understanding of human function under high-G stress, and hopefully preventing future occurrence of such injury.

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