Exposure to high altitude causes deterioration in cognitive performance and emotional changes. The aim of this study was to evaluate selected aspects of cognitive and emotional processing in non-acclimatized subjects, during short-term exposure to hypobaric hypoxia.

21 subjects were grouped into 3 groups of 7 each. They were tested in a hypobaric chamber using a profile that lasted for 2 hours (30 min test sessions separated by 10 min intervals). There were 2 altitude profiles, 450m-1500m-4500m & 450m-1500m-3000m and a control profile, 450m-650m-650m.

Cardiorespiratory parameters like oxygen saturation (SaO₂), heart rate (HR), blood pressure (BP) and end tidal partial pressure of O₂ and CO₂ (P₄O₂ and P₄CO₂) were acquired during the beginning and end of each test session. Neuropsychological tests included a letter fluency task for 2 minutes and three word association tasks for 1 minute each. Hemispheric processing of affective material was assessed using a lateralized tachistoscopic lexical decision task.

There was a significant reduction in P₄CO₂ and SaO₂ in both altitude profiles at high altitude, with a correlated reduction in diastolic BP. There was no significant main effect of altitude on any of the four neuropsychological tasks. In the tachistoscopic data, only significant effects or interactions were a significant main effect of “visual field”, with better detection in right visual field and a significant interaction between “word emotionality” and “visual field”.

Central hypoxia, as indicated by reduction in diastolic BP and SaO₂ is not paralleled by a decline in neuropsychological performance. This suggests that during acute exposure to hypobaric hypoxia at simulated altitudes of 3000 and 4500 m, short term adaptation mechanisms lead to preservation of frontal lobe cognitive and emotional functions. Functional hemispheric asymmetries for emotional processes also remained unchanged.

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One of the most serious concerns about space missions is the exposure to radiation. The cosmic sources of radiation are classified as solar particle events and galactic cosmic radiation. The article deals with the various forms of radiation, their components and the unit to measure the radiation. The mechanisms involved in radiation injury like the breakdown of DNA in proliferating cells and the production of free radicals are also discussed.

The authors have brought out primary preventive measures of selecting an astronaut with low cumulative career radiation exposure. Secondary preventive measures like effective shielding, an early warning system and administration of radioprotective compounds like Amifostine (Sulphydryl compound) are also highlighted. Tertiary management methods to counter the manifestations of acute radiation syndrome such as acute bone marrow syndrome, acute gastrointestinal syndrome and acute cardiovascular and central nervous system syndrome are discussed in detail.

The different kind of pathogens responsible for infections in space missions and neutropenic fever and the choice of antibiotics against these pathogens have also been discussed. Finally, the article concludes with recommendations for early detection of hazardous level of radiation, early management of acute radiation syndrome and methods to determine the safe level of acute radiation syndrome.

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