

9TH MULTIDISCIPLINARY INTERNATIONAL Conference of Biological Psychiatry

«Stress and Behavior»

Proceedings of the 9th International Multidisciplinary Conference «Stress and behavior»

Saint-Petersburg, Russia, 16–19 May 2005

Editor: Allan V. Kalueff, PhD

CONFERENCE ABSTRACTS

1. PSYCHOPHARMACOLOGY

PHARMACOLOGICAL CORRECTION OF VESTIBULAR STRESS SYNDROME IN THE AIRCREW

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One of the main tasks to be solved by aerospace medicine specialists is to provide flying safety and to enforce effectiveness and reliability of flying personnel performance. The practice of medical support of flights shows that because of the angular and coriolis accelerations, and optokinetic stimuli during a flight some young pilots demonstrate symptom complex of motion sickness which complicates the process of mastering a trade and decreases flying safety. It is due to vegetative reactions that flying personnel has general condition worsened, impairment of spatial orientation and coordination, different illusions. There is sluggishness, weakness, as well as vestibular sensory, vegetative and somatic reactions indicating to the reduction of vestibular tolerance. Besides, such factors as appearance of high-maneuvre and superfast aircrafts from the one hand, and also severe reduction and irregularity of training flights from the other lower vestibular tolerance. Nowadays, peculiarities of flying personnel performance influence the functional state of pilots, their capability to operate, psycho-physiological reserves, and their general condition. While accomplishing the mission, especially in difficult flights or accidents, pilots experience significant nervous emotional strain to imply stimulation of functional systems which leads to successful decision of flying task. When the flying conditions are difficult, psycho-physiological reserves are worn out. It results in nervous emotional stress with negative emotional motor (stiffness or restlessness), sensor (slowed-up perception and attention), and intellectual (mental retardation, and reduced memory, up to being forgotten the simplest instructions) reactions. This state is characterized by specialists as border-line, after that psychic or psychosomatic pathology may appear. More commonly, flying personnel's nervous emotional stress transforms in fatigue, or overfatigue if flying workload is not decreased. Experience of medical support of flights finds all the pilots to suffer from nervous emotional stress in modern high-maneuvre aircraft, and during different flights, with the 1st signs of nervous emotional stress and fatigue being after 2–3 sorties per shift as a rule or 1–2 sorties in difficult meteoconditions, or in night flights. The exposure of optokinetic stimuli, angular and coriolis accelerations to a pilot together with nervous emotional strain results in development of so-called vestibular stress-syndrome. The condition given appears as a result of mutual enhancement of unfavourable manifestations of motion sickness and nervous emotional strain and is characterized by marked vestibulo-vegetative reactions, decrease of performance, great number of errors, and severe ones among them. In turn, this leads to decrease of effectiveness and reliability of aircrew performance. Prophylaxis of vestibular stress-syndrome should be based on the conception to keep the professional health of a pilot. It means body's capability to keep compensatory and preventive reserves maintaining high level of performance during the whole flight and while operating in different climatic conditions. Being the main content of medical support of flights, restorative medicine principles and prophylaxis of professional health imply opportune correction of functional state, and restoration of body psycho-physiological reserves. The task given should be decided in 2 ways: enhancement of pilot's vestibular tolerance and correction his emotions (prophylaxis of nervous emotional strain). Aviation medicine specialists noticed high spirits to pull up vestibulo-vegetative disturbances. It is proved by the following way: sometimes pilots with high vestibular tolerance suffer from motion sickness when they fly as passenger; however, as soon as they begin to pilot an aircraft, all the symptoms of airsickness disappear. Pharmacological correction is considered to be one of the most effective means of correction of the functional state. Pharmacological correction of man's emotions may be accomplished by tranquilizers (anxiolytics) relieving subjective and vegetative components of psychological stress in excessive exertion, and maintaining pilot's capacity to operate. Alpha-adrenoblocker pyrroxane, for example, is used to prevent sympatoadrenal crisis, Menier's syndrome, motion sickness,

morphine and alcoholic withdrawal. The purpose of this study is to appreciate anti-motion sickness effect of pyrroxane and its influence on aircrew's capacity to operate. The research was accomplished in the departments of Pharmacology and Aviation and Aerospace Medicine of RF Military Medical Academy. Subjects were 20 volunteers (men) of normal health and aged 21–40 years. Vestibular load was imitated (stimulated) on a rotary chair with CVCCS (Coriolis Vestibular Cross-Coupling Stimulation) probe. Volunteers were divided in 2 groups (experimental and control) with 10 men in each one. The experimental group took pyrroxane (30 mg, once, p.o) 40 minutes before CVCCS probe. Control group took placebo. Operator performance was estimated with RDO (Reaction to Driven Object) and CSR (Complex Sensomotor Reaction) tests, «Automated Estimating Complex of Operator's Important Professional Qualities» before and after vestibular load. Analysis of the results shows that compared to control group, volunteers from experimental group had higher CVCCS probe tolerance time (+64%, from 5.6 to 9.2 min, $p < 0.005$), reduced vegetative reactions (–14%, from 7.9 to 6.8 points, $p < 0.05$), improved operator performance rate: RDO (–63%, from 55.5 to 20.2 msec, $p < 0.01$) and CSR (+73%, from 1.624 to 2.823 bit/sec, $p < 0.05$). Collectively, this suggests optimization of experimental group volunteers functional state. Thus, pyrroxane increases vestibular tolerance, and at the same time affects positively the operator performance. It may be recommended as prophylactic mean against vestibular stress-syndrome in the aircrew.