
The hypnotic Zolpidem and the hormone Melatonin were evaluated and directly compared for their effects on performance, when subjects sleeping under their influence were prematurely awakened from daytime sleep. The cognitive performance has consistently been found to be impaired when Zolpidem is present at peak or near peak plasma levels during the immediate hours following ingestion. Similarly, the hormone Melatonin also induces sleep with doses typically of 3-10 mg and the mean peak plasma level for a daytime dose occurs about an hour after ingestion and the elimination half life is about 2-3 hrs.

The author’s method was with the inclusion of non sleep deprived volunteers who received single oral doses of 5 or 10 mg Melatonin and 10 or 20 mg of Zolpidem or placebo immediately before retiring at 1300 hrs. Performance testing and subjective evaluations occurred prior to dosing and following forced awakening at 1500 hrs, 2 hrs after dosing.

Compared with placebo on being awakened following zolpidem, there was significant decrement in the cognitive tasks, including grammatical reasoning, mathematical processing and word memory. Under melatonin, the performance decrements did not occur and were considerably less severe, brief, and less systematic than for zolpidem.

It was concluded that when the operational personnel sleeping with Zolpidem is awakened prematurely it is prudent to evaluate their general well being and possible need for assistance, prior to being permitted to depart crew rest or to perform tasks and duties. The same was not seen after premature awakening with melatonin hormone.

Surg Lt Cdr PD Ayengar
Resident, MD Aviation Medicine


Modern generation aircraft such as JAS 39 Gripen are capable of generating sustained acceleration as high as 9 Gs. Protection against the physiologic effects of acceleration of this magnitude, in the case of Gripen aircraft is provided by the anti G ensemble (AGE 39): full coverage anti G suit, a pressure breathing system and anti G straining maneuvers (AGSM). The authors conducted this study to investigate the interaction of the G protections afforded by straining maneuvers and pressure breathing and to establish the G protective properties of the individual components in the AGE 39.

The study was conducted in two experimental settings. In the first setting, 10 subjects during rapid onset G-time profiles were investigated in 5 conditions: i) Control (ctrl): sitting relaxed without any G protective garment; ii) AGS: sitting relaxed and wearing an anti G suit; iii) sitting relaxed, wearing an anti G suit and pressure breathing; iv) wearing an anti G suit and performing AGSM; and v) wearing an anti G suit, pressure breathing and performing AGSM.

In the supplementary experiments, with 9 subjects, the share of the anti G suit protection afforded by the abdominal bladder was investigated. The subjects were exposed to 3 experimental conditions: i) Control (ctrl): sitting relaxed without any G protective garment; ii) AGS: sitting relaxed and wearing an anti G suit; iii) AGLS (anti G leg suit): sitting relaxed and wearing a modified anti G suit without abdominal bladder. There were no incidences of G-induced loss of consciousness or any other adverse events during the course of the experiments.

Results confirmed that the G countermeasures used in Gripen aircraft provide efficient G protection. The anti G suit increased relaxed G tolerance by about 3.0G, of which a third appears to be provided by the abdominal bladder. The G protective properties of the anti G suit and those of pressure breathing appear to be additive, whereas the G protection afforded by the pressure breathing does not add to that provided by anti G straining maneuvers. The pressure breathing reduces the need for muscular straining at low and moderate G loads, which, in turn, minimizes the risk of straining induced fatigue and hence improves G endurance.

Maj S Bhardwaj
Resident, MD Aviation Medicine