
Carbon monoxide poisoning has been the cause of death in humans since the first human discovered the use of fire for warmth, protection and cooking. It continues today as a cause of death in humans. The introduction of household products containing synthetic nitrogenous materials in the early 19th century has increased the chance of hydrogen cyanide (a toxic combustion gas) production in a fire. It is important in aviation accident investigations to determine if a fire occurred during flight or after the crash and to establish the source(s) of the toxic gases.

The Civil Aviation Medical Institute (CAMI) Bioaeronautical Sciences Research Laboratory receives biological specimens from almost all fatal aviation accidents that occur in the United States. In blood, CO is analyzed as carboxyhemoglobin (COHb) and hydrogen cyanide as cyanide (CN−) using spectrophotometric methods. Analytical data were stored in a database and this database was searched for the period 1990-2002 for the presence of COHb and CN− in the submitted cases.

Out of 5945 cases, there were 223 (4%) cases wherein COHb was ≥10%. Of the 223 cases, fire was reported with 201, no fire with 21, and undetermined fire status with 1. CN− concentrations were at above 0.25 g/ml in 103 of the 201 fire related cases. None of the 21 non-fire cases had CN−, but nicotine was detected in 9 of the cases. All non-fire cases with COHb >30% (four cases) were associated with exhaust leaks. Of the 223 cases, COHb-CN− fractional toxic concentration (FTC) was lethal only in 31 cases with elevated CN− levels.

The presence of COHb and CN− in elevated concentrations in the blood of victims found by autopsy to have died on impact would indicate an in-flight fire. In the absence of fire and CN−, the elevated COHb concentrations would suggest an exhaust leak, particularly at COHb>30%. The findings of this study suggest that, in addition to COHb, CN− plays a detrimental role in fire-associated aviation accident fatalities.


In military aviation, “24/7” schedules are often essential for effective mission completion. Human operators need periodic sleep for restoration of both body and brain. But sleep is often difficult in the operational context since cockpits as well as living arrangements are not conducive to sleep, and also because sometimes mission requirements do not provide opportunities for sleep. The paper discusses pharmacological approaches - for optimizing sleep opportunities when available; and for sustaining alertness upon unavoidable sleep deprivation.

The report provides a basic overview of factors to be considered when implementing pharmacological solutions to fatigue-related problems in the military aviation context. Various components of US military have approved limited use of certain sleep-promoting drugs and alertness-enhancing drugs. Sleep-promoting compounds can optimize quality of crew rest during problems with sleep initiation or maintenance. When unavoidable manpower constraints, hostile circumstances or extremely high workloads require postponement of sleep, stimulants can temporarily stave off the deleterious effects of fatigue. However, benefits and risks associated with the use of these compounds should be considered by the flight surgeon, unit safety officer and the individual pilot before use of the drug.

The combined use of stimulants and hypnotics has not been researched, and caution should be exercised when considering prolonged combined use. The authors concluded that drugs are not a substitute for good work/rest scheduling and proper staffing, and should not be administered indiscriminately or in absence of medical oversight. Nonetheless, in operational circumstances that warrant use of pharmacological fatigue-countermeasures, properly administered and supervised therapies can enhance both safety and effectiveness of military aviation personnel.

Compiled by Sqn Ldr Rajesh Joshi
Resident, Aviation Medicine


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President’s Column

Thirty seven years ago when I got commissioned in the Army Medical Corps, never in my wildest dreams did it occur that I would eventually head the Air Force Medical Services and become President of one of the most renowned and internationally acclaimed professional body - the Indian Society of Aerospace Medicine. From being among the men in OG uniform, it has been a big change to be among the Air Warriors in Blue. But I can assure you all that I am enjoying each day, in fact each moment of the challenge that this opportunity is providing me.

I consider it as a singular honour and privilege to head this Society now. The Society has had a glorious past and is on the threshold of a major milestone. As you all are aware, the Society will be hosting the 54th ICASM in Sep 2006 at Bangalore. The Society is a veteran in holding such events and the fact that it has been given this opportunity the second time speaks of the confidence of the International Academy in its capabilities. I exhort each and everyone, to put in the best to ensure that the event is a grand success.

The Society’s reputation is built upon the success of its members. The Society will have to play an even stronger and active role not only in military aviation but civil aviation as well. I am sure the members of the Society will equip themselves with professional knowledge that will hold them in good stead in meeting the challenges of Aerospace Medicine in our country.

I look forward to meeting the members of the Society in different fora in the months to come. I wish each one of you and your families a very Happy New Year.

Jai Hind.