P-2024

DISCUSS STRATEGIES TO COMBAT HIGH ALTITUDE EFFECTS

CONDITIONS

You are a Mission Scanner trainee and must discuss how to recognize and combat high altitude effects.

OBJECTIVES

Discuss high altitude effects and demonstrate strategies to deal with them.

TRAINING AND EVALUATION

Training Outline

1. As a Mission Scanner trainee, knowing how high altitude effects you and your crew and strategies to deal with the effects is essential.

2. Dehydration. When operating in high altitudes or temperatures, body water is continuously expired from the lungs and through the skin: this physiological phenomenon is called insensible perspiration or insensible loss of water. Water loss is increased in flight because of the relatively lowered humidity at altitude, particularly on extended flights. Typical dehydration conditions are: dryness of the tissues and resulting irritation of the eyes, nose, and throat, and fatigue relating to the state of acidosis (reduced alkalinity of the blood and body tissues). A person reporting for a flight in a dehydrated state will more readily notice these symptoms until fluids are adequately replaced.

When operating in high altitudes or temperatures, crewmembers should make every effort to drink plenty of water, juice, or caffeine-free soft drinks prior to, during, and after each mission to help prevent dehydration. Consumption of coffee, tea, cola, and cocoa should be minimized since these drinks contain caffeine. In addition, tea contains a related drug (theophyline), while cocoa (and chocolate) contain theobromine, of the same drug group. These drugs, besides having a diuretic effect, have a marked stimulating effect and can cause an increase in pulse rate, elevation of blood pressure, stimulation of digestive fluid formation, and irritability of the gastrointestinal tract.

Increasing the flow of outside air through the aircraft interior by the use of vents, or opening windows or hatches can usually remedy heat-related problems. If sufficient airflow cannot be gained, cooler air can usually be located by climbing the aircraft to a higher altitude. This may be inconsistent with search altitudes assigned by the incident commander or may be beyond the performance capability of the aircraft.

3. Ear block. As the aircraft cabin pressure decreases during ascent, the expanding air in the middle ear pushes the Eustachian tube open and, by escaping down it to the nasal passages, equalizes in pressure with the cabin pressure. But during descent, passengers must periodically open their Eustachian tube to equalize pressure. This can be accomplished by swallowing, yawning, tensing muscles in the throat or, if these do not work, by the combination of closing the mouth, pinching the nose closed and attempting to blow through the nostrils (valsalva maneuver).

4. Sinus block. During ascent and descent, air pressure in the sinuses equalizes with the aircraft cabin pressure through small openings that connect the sinuses to the nasal passages. Either an upper respiratory infection, such as a cold or sinusitis, or a nasal allergic condition can produce enough congestion around the opening to slow equalization and, as the difference in pressure between the sinus and cabin mounts, eventually plug the opening. This "sinus block" occurs most frequently during descent. A sinus block is prevented by not flying with an upper respiratory infection or nasal allergic condition. Adequate protection is usually not provided by

decongestant sprays or drops to reduce congestion around the sinus openings. Oral decongestants have side effects that can impair pilot performance. If a sinus block does not clear shortly after landing, a physician should be consulted.

5. Hypoxia. Hypoxia is a state of oxygen deficiency in the body sufficient to impair functions of the brain and other organs. Hypoxia from exposure to altitude is due only to the reduced barometric pressures encountered at altitude, for the concentration of oxygen in the atmosphere remains about 21 percent from the ground out to space. *The body has no built-in warning system against hypoxia*. Although deterioration in night vision occurs at a cabin pressure altitude as low as 5,000 feet, other significant effects of altitude hypoxia usually do not occur in the normal healthy person below 12,000 feet. From 12,000 to 15,000 feet of altitude, judgment, memory, alertness, coordination and ability to make calculations are impaired. Headache, drowsiness, dizziness and either a sense of euphoria or belligerence may also occur. In fact, pilot performance can seriously deteriorate within 15 minutes at 15,000 feet.

Hypoxia can be prevented by: heeding factors that reduce tolerance to altitude, by enriching the inspired air with oxygen from an appropriate oxygen system and by maintaining a comfortable, safe cabin pressure altitude. For optimum protection, pilots are encouraged to use supplemental oxygen above 10,000 feet during the day, and above 5,000 feet at night. The Federal Aviation Regulations require that the minimum flight crew be provided with and use supplemental oxygen after 30 minutes of exposure to cabin pressure altitudes between 12,500 and 14,000 feet, and immediately on exposure to cabin pressure altitudes above 14,000 feet. Every occupant of the aircraft must be provided with supplement oxygen at cabin pressure altitudes above 15,000 feet.

Additional Information

More detailed information on this topic is available in Chapter 7 of the MART.

Evaluation Preparation

Setup: None.

Brief Student: You are a Scanner trainee asked to discuss the effects of high altitude on the body and strategies to deal with the conditions.

Evaluation

Performance measures	Results	
1. Discuss the symptoms and dangers of the following:		
a. Ear block.	P	F
b. Sinus block.	P	F
c. Hypoxia.	P	F
2. Discuss strategies used to combat these symptoms.	P	F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.