Aerospace Medical Association

Medical Guidelines for Airline Travel

Stresses of Flight

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Modern commercial aircraft are very safe and, in most cases, reasonably comfortable. However, all flights, short or long haul, impose stresses on passengers. Pre-flight stresses include airport commotion on the ground such as carrying baggage, walking long distances, getting to the gate on time, and being delayed. In-flight stresses include acceleration, vibration (including turbulence), noise, lowered barometric pressure, variations of temperature and humidity, and fatigue among others (1). Nevertheless, healthy passengers normally tolerate these stresses quite easily and for the most part they are quickly forgotten once the destination is reached. In general, passengers with a stable illness also usually reach the destination airport without ill effect. However, there is the potential for passengers to become ill during or after the flight due to these stresses, especially for those with pre-existing medical conditions and reduced physiological reserves.

The primary difference between the aircraft cabin environment and the ground environment relates to the atmosphere as aircraft cabins are not pressurized to sea level equivalent. Instead, on most flights the cabin altitude will be between 5000 and 8000 ft (1524m and 2438m). This results in reduced barometric pressure with a concomitant decrease in partial pressure of oxygen (pO_2). While the barometric pressure is about 760 mm Hg at sea level with a typical corresponding PaO_2 (arterial oxygen pressure) of 98 mm Hg, the barometric pressure at 8000 ft will be about 565 mm Hg resulting in a PaO_2 of 55 mm Hg. If these latter data are plotted on the oxyhemoglobin dissociation curve, we obtain a blood oxygen saturation of 90%. Although most healthy travelers can normally compensate for this degree of hypoxemia, this may not be true for patients having coronary, pulmonary, cerebrovascular or anemic diseases. Because these patients may already have a reduced PaO_2 on the ground, further reduction in aircraft cabin pressure could bring them to the steep part of the oxyhemoglobin dissociation curve with, potentially, a resultant very low saturation, causing distress and/or exacerbation of their illness (Fig 1).

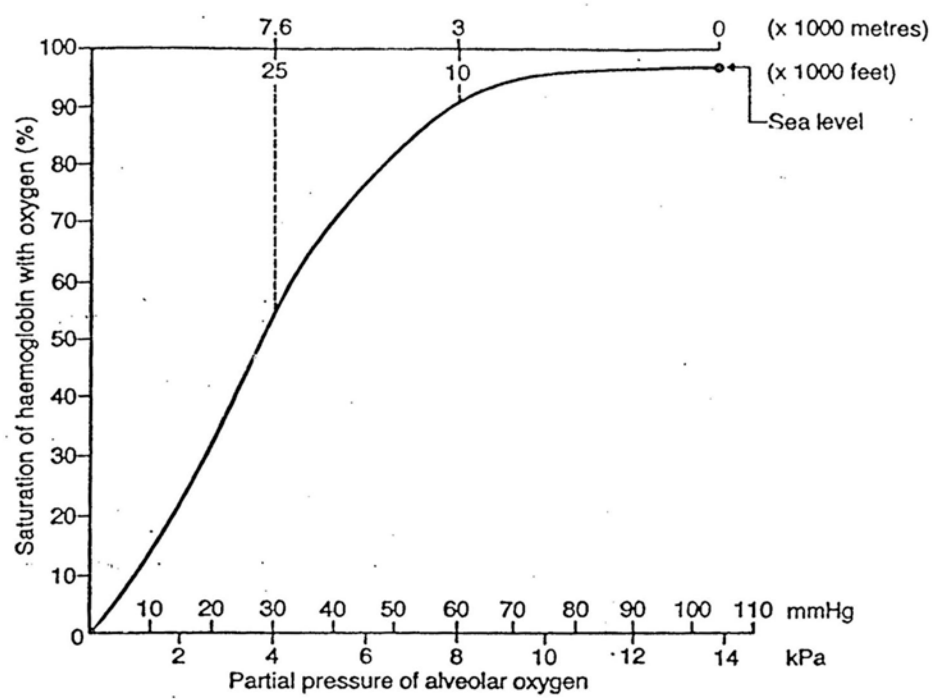

Figure 1. Oxyhemoglobin Dissociation Curve

Today's aircraft have low cabin humidity, usually ranging from 10-20%. This is unavoidable because the outside air at high altitude is practically devoid of moisture. As a result, there can be a drying effect of airway passages, the cornea (particularly under contact lenses), and the skin. However, there is no core dehydration if the passenger continues normal intake of fluids, but limiting alcohol and caffeine. (2)

Fortunately, the irritant effects of tobacco smoke are no longer a significant problem, since the vast majority of airline flights are non-smoking. For passengers with the potential for in-flight nicotine withdrawal symptoms, a variety of nicotine gum or patches can be considered, although use of so-called 'electronic cigarettes' are not permitted by most airlines.

Jet lag or circadian desynchronosis results from the desynchronization of the body clock with surrounding environmental cues. It may be not only an annoyance for well passengers, but it can also complicate the timing of medications, such as insulin (See Jet Lag and Diabetes sections).

On commercial flights, regardless of aircraft type, many passengers may sit in a relatively small, cramped space. This is not only uncomfortable, but also reduces the opportunity to get up, stretch, and walk about the cabin. Sitting for long periods is tolerable for most passengers, but for some there is the potential for exacerbating peripheral edema, cramps, and other circulatory problems. Immobility is also a risk factor for deep venous thrombosis (See Deep Venous Thrombosis section).

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