Jet Lag

Description

The term “jet lag” is used to describe symptoms that result from temporary desynchronization of circadian rhythm between a traveler’s internal clock and the external environment (1). When the traveler crosses several time zones rapidly, physiologic rhythms that are innately synchronized with the day-night cycles must be reset to match the new time zone. Although incompletely understood, these rhythms include diurnal variation in body temperature and cortisol secretion. The major known mediator of the internal clock is melatonin, which is secreted by the pineal gland in response to darkness and induces sleepiness. Daylight suppresses melatonin secretion; meals and other factors also influence its secretion.

Occurrence

Eastward travel is associated with difficulty in falling asleep at the new bed-time and difficulty arising in the morning, while westward travel is associated with early evening sleepiness and predawn awakening (2). Even after returning home, a traveler may experience prolonged disordered sleep patterns. Resumption of normal sleep may require 2 days after an eastward voyage and 5 days after re-turning from the west (3).

Risk for travelers

Individual responses to crossing time zones and ability to adapt to the new time zone vary. Increasing age, crossing more time zones, or traveling eastward generally increase the time required for adaptation. Situations requiring critical decision-making, such as important meetings, should be avoided for the first day after arrival, if possible.

Clinical Presentation

Symptoms of jet lag are temporary and include excessive daytime sleepiness, nighttime insomnia, decreased performance, headache, general malaise, appetite loss, and dysregulation of gastrointestinal and urinary schedules (1).

Prevention

Jet lag may be minimized by avoiding large meals or dehydration, limiting caffeine and alcohol consumption during the flight, optimizing exposure to available sunlight following arrival from either direction of travel, breaking up the journey with a stop-over, and careful use of melatonin prior to desired sleep time (1,4).

Treatment

Persons traveling eastward should seek bright light in the morning, while those traveling westward should seek bright light in the afternoon. Adjustment after westward travel may be less difficult, as the traveler may more easily stay awake in the daylight as long as possible. In general, the more time spent outdoors in the first several days following travel, the faster the adjustment to the new time zone.
A variety of nonpharmacologic therapies have been used to attenuate the symptoms of jet lag. In principle, efforts to adjust light exposure, activity, and meal times to the new schedule as soon as possible after arrival promote more rapid resetting of the internal clock. Outside daylight, even on cloudy days, is more intense than interior lighting. Light visors or lamps mimicking daylight have been proposed by some authors to stimulate normal circadian rhythms in travelers or shift workers (2).

The Argonne diet, which alternates high- and low-calorie days before departure, is often cited as a treatment for jet lag but has not been formally studied. The main benefit of this diet may be the inclusion of high-protein breakfasts, which increase levels of tyrosine and thus epinephrine and dopamine, promoting alertness, and high-carbohydrate dinners, which increase serotonin and melatonin and promote evening sleepiness (5).

Over-the-counter and prescription medications have been used to promote sleep on long trips or at the new bedtime after arrival. Melatonin is available in the United States as a dietary supplement. Although no results from rigorous studies of safety or dosage of melatonin are available, limited evidence suggests melatonin is safe and well tolerated, and doses of 0.5-5 mg may promote sleep and decrease jet lag symptoms in travelers crossing five or more time zones (6,7). Melatonin should be taken at the desired bedtime, beginning 3-4 days before departure if possible. Although melatonin is generally considered safe, adverse effects such as sedation or a disorienting “rocking” feeling have been reported. The safe use of melatonin in persons with epilepsy, who take warfarin or other oral anticoagulants and in children has been questioned (6). These travelers should discuss the potential for adverse effects with their physicians prior to its use.

Prescription nonaddictive sedative hypnotics, such as zolpidem or zopiclone, have been shown in some studies to promote longer periods of high-quality sleep in travelers experiencing jet lag (1,4,8). Benzodiazepines have a direct effect on neurons mediating the internal clock, as well as a hypnotic effect. Short-acting drugs in this class, such as temazepam, are preferred to minimize oversedation the following day (4). In making the decision to use sedative hypnotics, even in the short-term, the potential benefits should be weighed against potential adverse effects. Combined use of sedative hypnotic medications and melatonin has been associated with nausea, vomiting, confusion, dizziness, headache, and dry mouth (6).

Agents that promote alertness, such as caffeine or prescription CNS stimulants (e.g., amphetamines, pemoline, or modafinil), may interfere with normal sleep patterns and often have adverse effects and potential for dependence (2, 4).

References