Altitude Medication during Kilimanjaro climb

High-Altitude Travel & Altitude Illness

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Environments significantly above sea level expose travelers to cold, low humidity, increased ultraviolet radiation, and decreased air pressure, all of which can cause problems. The biggest concern, however, is hypoxia. At an elevation of 10,000 ft (3,000 m) above sea level, for example, the inspired PO2 is a little more than two-thirds (69%) what it is at sea level. The magnitude of hypoxic stress depends on elevation, rate of ascent, and duration of exposure. Sleeping at high elevation produces the most hypoxemia; day trips to high elevations with return to low elevation are much less stressful on the body. Typical high-elevation destinations include Cusco (11,000 ft; 3,300 m), La Paz (12,000 ft; 3,640 m), Lhasa (12,100 ft; 3,650 m), Everest Base Camp (17,700 ft; 5,400 m), and Kilimanjaro (19,341 ft; 5,895 m; see Chapter 10, Tanzania: Kilimanjaro).

The human body adjusts very well to moderate hypoxia,but requires time to do so (Box 3-05). The process of acute acclimatization to high elevation takes 3–5 days; therefore, acclimatizing for a few days at 8,000–9,000 ft (2,500–2,750 m) before proceeding to a higher elevation is ideal. Acclimatization prevents altitude illness, improves sleep and cognition, and increases comfort and well-being, although exercise performance will always be reduced compared to what it would be at lower elevations. Increase in ventilation is the most important factor in acute acclimatization; therefore, respiratory depressants must be avoided. Expanded red-cell production does not play a role in acute acclimatization, although hemoglobin concentration is increased within 48 hours because of diuresis and decreased plasma volume.

RISK FOR TRAVELERS

Inadequate acclimatization may lead to altitude illness in any traveler going to 8,000 ft (2,500 m) or higher, and sometimes even at lower elevations. Susceptibility and resistance to altitude illness are genetic traits, and no simple screening tests are available to predict risk.

Training or physical fitness do not affect risk. Children are equally susceptible as adults; people aged >50 years slightly so. How a traveler has responded to high elevations previously is the most reliable guide for future trips if the elevation and rate of ascent are similar, although this is not an infallible predictor. Given a baseline susceptibility, 3 factors largely influence the risk of a traveler developing altitude illness: elevation at destination, rate of ascent, and exertion (Table 3-04). Creating an itinerary to avoid any occurrence of altitude illness is difficult because of variations in individual susceptibility, as well as in starting points and terrain. The goal for the traveler may not be to avoid all symptoms of altitude illness but to have no more than mild illness.

Some common destinations (such as the ones mentioned above) require rapid ascent by airplane to >3,400 meters, placing travelers in the high-risk category (Table 3-04). Chemoprophylaxis may be necessary for these travelers, in addition to 2–4 days of acclimatization before going higher. In some cases, such as Cusco and La Paz, the traveler can descend to elevations much lower than the airport to sleep.

Box 3-05. Tips for acclimatization

- Ascend gradually, if possible. Avoid going directly from low elevation to more than 9,000 ft (2,750 m) sleeping elevation in 1 day. Once above 9,000 ft (2,750 m), move sleeping elevation no higher than 1,600 ft (500 m) per day, and plan an extra day for acclimatization every 3,300 ft (1,000 m).
- Consider using acetazolamide to speed acclimatization if abrupt ascent is unavoidable.
- Avoid alcohol for the first 48 hours; continue caffeine if a regular user.
- Participate in only mild exercise for the first 48 hours.
- Having a high-elevation exposure (greater than 9,000 ft [2,750 m]) for 2 nights or more, within 30 days before the trip, is useful, but closer to the trip departure is better.