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Altitude Sickness

Altitude sickness is a spectrum of illnesses that occur during elevation ascents in individuals who are not acclimated. The cause is thought to be a combination of hypoxia (low oxygen) and hypobaria (low atmospheric pressure) resulting in vascular changes in the lungs and brain.

High altitude is a relative term. People who live at an altitude of 5,000 to 6,000 feet usually do not suffer altitude sickness until thay have climbed to 10,000 or 12,000 feet, but people who have lived at lower levels may feel symptoms at 6,000 to 8,000 feet.

The most common ascent-related illness is **acute mountain sickness (AMS)**. Flu-like symptoms, such as headache, nausea, vomiting, loss of appetite, dizziness, fatigue and insomnia are by far the most common effects of AMS.

AMS represents the mild end of the spectrum of altitude sickness. At high altitudes air pressure is much lower so only about half as much oxygen is inhaled with each breath. The heart and lungs have to work harder. Pressure in the capillaries can cause them to leak fluid into the lungs - a condition called **HAPE (high altitude pulmonary edema)**. Symptoms include shortness of breath at rest, especially at night, persistent cough, rattling breaths, chest tightness, and blue lips or fingernails. Pink frothy sputum is a very late sign. HAPE can be fatal if not treated quickly.

Another potentially lethal condition is cerebral edema - swelling of the brain called **HACE (high altitude cerebral edema)**. There is a hazy line between moderate to severe AMS and HACE. Symptoms of more severe AMS include unrelieved headache, decreased urine output, vomiting and lethargy. Loss of balance (ataxia), mental confusion, irrational behavior and coma indicated HACE. The progression from initial symptoms to coma may take as little as 12 hours. Death follows if early treatment is not administered.

Factors that increase incidence of AMS:

- Fast ascent (more than 3,000 feet/day)
- Altitude attained, especially a sleeping altitude over 10,000 feet
- Strenuous exertion at high altitudes
- Time spent at altitude
- Previous history of AMS (the most important risk factor)
- Not being sufficiently acclimatized.

Normal symptoms at altitude:

- Shortness of breath on exertion is normal. If shortness of breath also occurs at rest, HAPE should be considered
- Frequent nocturnal awakening can be a symptom of HAPE
- Edema of the extremities and face due to fluid retention can occur as an isolated finding without symptoms of AMS
- Periodic breathing occurs normally at altitude during sleep. It is characterized by periods of rapid breathing followed by slowing of respiration and then a period of no breathing that can last 10 to 15 seconds
- Appetite may be poor at altitude (carbohydrate rich foods are better tolerated than fatty foods).

Prevention and treatment of altitude sickness:

Most people with mild altitude sickness improve with no treatment. For HAPE and HACE, descent is the definitive treatment. All other treatments are temporizing mechanisms until descent can be achieved.

- Acclimatize - do not increase your sleeping altitude by more than 2,000 to 3,000 feet per day. If possible, try and sleep at a lower altitude.
- Avoid alcohol, sleeping pills or narcotics. They may depress breathing and make symptoms worse.
- Drink plenty of fluids.
- Eat high-carbohydrate foods.
- Avoid heavy exercise, mild exercise is better.

For major expeditions at altitude, the following prescription medications may be considered. Discuss them with your travel medicine specialist.

- **Diamox (acetazolamide)** tablets (125 to 250 mg) taken twice a day has been shown to prevent altitude sickness. Start acetazolamide 24 hours before you start your ascent and continue for three days at the higher altitude. Side effects include frequent urination and a tingling sensation in the face and lips. Acetazolamide is a sulfa drug and should not be taken by people with allergies to sulfa drugs. If symptoms of altitude sickness occur, the dosage of acetazolamide may be increased to 125 to 250 mg every 8 to 12 hours.
- **Aspirin** before travel to high altitudes appears to decrease the incidence and severity of headaches, the main symptom of mild AMS. Take one aspirin tablet every four hours for three doses before arrival. After arrival, take two tablets three times daily for three days.
- **Ginkgo biloba** has been shown in studies to reduce AMS from 35% to 100%. It is more effective with a moderate rate of ascent. Dosage is 80 to 120 mg orally twice daily starting 5 days before and continuing while at altitude. It also may keep fingers and toes warmer.
- **Oxygen** - breathable oxygen can relieve symptoms.
- **Dexamethasone** is not used to prevent AMS, but reduces symptoms.
- **Nifedipine** for prevention or treatment of HAPE. (No value for AMS or HACE.)