HEALTH PROBLEMS AT HIGH ALTITUDE

More often than not, attempts to predict performance at altitude are no better than guessing. However, over the age of 50, only very fit people who exercise regularly and have some experience with high altitude should try to go to 15,000 feet. Narrowing of the arteries (atherosclerosis), which occurs in everyone to varying degrees, further limits the delivery of oxygen to the brain and heart. This can lead to angina, congestive heart failure, altered mental function, or even heart attack or stroke.

What is Acute Mountain Sickness?

Acute mountain sickness (AMS) refers to a spectrum of medical problems that may occur on ascent to altitude, ranging from mild symptoms to fatal illness. Mountain sickness may occur as low as 8,000 feet, but most serious illness is seen above 12,000 feet. With increasing altitude, there is a progressive decrease in barometric pressure and a corresponding decrease of oxygen in the air. This is the cause of AMS, however, the exact process that triggers illness is not known. Nor is it known why some persons become ill while others successfully acclimatize—a process of physiologic changes allowing the body to adapt to less oxygen in the air. In travelers to altitude, some of these acclimatization changes occur in days, others in weeks.

The incidence and severity of AMS depends not only on the altitude attained, but also on the rate of ascent. There is individual susceptibility, but no one is immune. Physical conditioning and prior success at altitude do not preclude illness. In fact, young, conditioned climbers have a higher incidence, probably because they push themselves harder. This does not imply that physical conditioning is unnecessary or undesirable. It means that even those in top physical condition must respect the limits on travel imposed by altitude.

Symptoms of AMS

Most people have experienced (but may not have recognized) mild symptoms of AMS, which include headache, lack of energy and appetite, nausea, dizziness, weakness, and insomnia. The symptoms begin 4-12 hours after arrival at altitude and are usually transient, lasting one to two days. In some people, symptoms progress to severe headache, irritability, nausea with vomiting, marked fatigue and shortness of breath with exercise. These symptoms indicate the development of pulmonary or cerebral edema, the most serious forms of AMS. No further ascent should be attempted with any of these serious symptoms, and descent should be strongly considered.

Pulmonary edema can be described as water on the lung. It first appears as excessive shortness of breath on exertion compared to other members in a party, and then progresses to shortness of breath at rest with a dry cough and/or wheezing. The heart rate and respiratory rate are increased. Marked periodic breathing (an irregular breathing pattern with periods of shallow or no breaths) is present during sleep. The victim may need to sit up due to severe shortness of breath when lying down. At this stage, oxygen is helpful and descent is mandatory. Deterioration can occur rapidly, usually at night, with the onset of severe respiratory distress, gurgling breathing, a frothy cough, and wet crackling sounds in the lungs. Confusion, coma, and death can then occur within hours.

Cerebral edema indicates swelling of the brain. The principal symptom is progressive headache that is unrelieved by mild pain relievers. Other symptoms of moderate AMS, such as dizziness, vomiting, and irritability, are usually present. The best simple test for early cerebral edema is to check the person's coordination by having him walk heel-to-toe (the drunk test). Presence of uncoordination, with progressive headache and lethargy (drowsiness, decreased responsiveness) mandates immediate descent.

Victims with this severe form of AMS can deteriorate overnight to a state of confusion and delirium followed by unconsciousness and death.

Treatment in the Field

First and foremost in the treatment of progressive AMS symptoms is evacuation to lower altitudes. Often a descent of 2,000-3,000 feet is enough. If oxygen is available, it is helpful and should be given, but never as a substitute for descent. Don't wait for the helicopter that may come too late or never at all.

Mild to moderate AMS can be watched carefully at the same altitude for one day to see if there is improvement. Lack of improvement in 12-24 hours or any signs of deterioration require immediate descent. Aspirin is most useful for the headache of AMS. Stronger medication, such as codeine, should be used with caution and only when a knowledgeable person is monitoring the victim. Sleeping pills should not be used for insomnia related to AMS; they depress breathing and may worsen symptoms. Acetazolamide (Diamox) is the best medication to treat symptoms of mild to moderate AMS and to aid sleep, but should be used only with knowledge of its effects and the proper dosing regimen.

Monitoring

It is very important for partners, and friends to monitor each other. Sometimes serious AMS goes unrecognized because the victim becomes unsociable and others assume that reclusive or bizarre behavior is their usual personality. Other cases are incorrectly diagnosed as a "flu" or traveler's infection. *Anyone who is doing poorly or feels ill at altitude should be assumed to have altitude illness!* Do not try to conceal symptoms and tough it out by pushing higher. Please keep the group leader or guide informed of any significant symptoms you, your partner or friend may have. Delay can result in deterioration from someone who could have walked down with assistance to a litter patient who is extremely difficult to carry down, or worse yet, to a corpse.

Prevention

The best prevention of AMS is slow ascent. Symptoms are common when flying or driving to 9,000 feet or above. While transportation to these altitudes is sometimes unavoidable given the time constraints, the hiking itinerary is planned to minimize risk of altitude sickness. Acclimatization is a progressive process. Successful acclimatization at one altitude results in only partial acclimatization to higher altitudes.

Overexertion disposes to AMS. Don't push beyond your ability; MLP's trek is designed to allow you to go at a comfortable individual pace. While physical conditioning does not prevent AMS, it makes any hike or climb less exerting.

Dehydration increases the risk for AMS and worsens the symptoms. Initially, fluid is retained at altitude. Women may note puffiness of fingers, ankles, and face. However, this does not mean that fluids should be restricted. On the contrary, intake of copious liquids will often initiate a diuresis that resolves the fluid retention as well as the symptoms of AMS.

Substantial protection from the symptoms of AMS can be obtained from acetazolamide (Diamox), a medication that promotes increased respirations and acts as a mild water pill. It is begun 12 hours prior to ascent and continued only 1-2 days after ascent. The dose is 125-250 mg in the morning and evening. Some people require only 1dose taken at bedtime for 1-2 nights. There are side effects and potential reactions to this medication, including a diuretic effect, tingling of the fingers and lips, and altered taste of beer and other carbonated beverages. Do not use Diamox if you are allergic to sulfa antibiotics, due to cross-reactions. Dexamethasone can also be used for prevention. Discuss these and other medications, as well as issues of high altitude, with a doctor who is knowledgeable in travel and altitude medicine before leaving.