# Acute Mountain Sickness (AMS)

**Liverpool School of Tropical Medicine**

Whether you are flying in to La Paz (3630m) or Lhasa (3658 m), sightseeing in Cuzco (3399m), trekking in the Himalayas (often above 4000m) or climbing Kilimanjaro (5895m), they all involve travelling at high altitudes.

**What is Acute Mountain Sickness? (AMS)**

Anyone may experience health problems related to the decreased availability of oxygen at altitude (usually above 2500m):
AMS is a collection of symptoms that appear typically 6-12 hours after arrival at altitudes above 2500m, and usually settle within one to three days if further ascent does not occur.

All travellers to high altitude areas should be aware of the risk of altitude sickness and take appropriate precautions. Symptoms are sometimes likened to the feeling of the "flu" coming on or a hangover, but can include headache, nausea, loss of appetite, breathlessness on exertion, tiredness, dizziness, difficulty sleeping; frequent awakenings and irregular breathing during sleep.

Severe mountain sickness may start suddenly without warning or progress from **AMS.** The severe forms of AMS occur due to fluid accumulation in the brain and/or lungs. These conditions are known as: High Altitude Cerebral Oedema (HACE) or High-Altitude Pulmonary Oedema (HAPE)

**HAPE** results in several symptoms such as breathlessness at rest, persistent cough, marked fatigue, increased heart rate, and tightness in the chest, frothy spit sometimes blood stained and or a bluish colour to the lips and fingernails.

**HACE** symptoms include mental confusion, severe headache, behavioural changes, drowsiness and difficulty with balance and co-ordination. Worsening of these symptoms will result in unconsciousness or coma and death.

- **Acetazolamide (Diamox)** can be used as prophylaxis for acute mountain sickness when a gradual ascent cannot be guaranteed. However, it does not prevent severe illness. The medication is available in the clinic for those who are going above 3000m and for those subjects who are slow acclimatisers. Requests for acetazolamide for those travelling to lower altitudes are sometime considered. Acetazolamide should not be used as an alternative to gradual ascent.
- Acetazolamide is a sulphonamide medication and is contraindicated in people who are allergic to sulphur drugs. It is also contraindicated in pregnancy. Other contraindications include breastfeeding, impaired renal/liver function, patients with pulmonary obstruction or emphysema, elderly (over 65 years), children, Patients taking aspirin more than 75mg/day, patients with metabolic or electrolyte abnormalities and people who are taking any other interacting medicines.
- Side effects include numbness or tingling in hands, feet, and lips, taste alterations, and ringing in the ears. The drug causes increased urination. A trial dose of 125mg twice daily for 2 days is recommended to familiarise patients with common mild side effects.

  The adult dose is 125mg twice a day, starting 1-2 days before reaching 3000 metres and to continue for 2 days until acclimatised or descending.
- **Other remedies** e.g. coca leaves and gingko biloba are used in some parts of the world, but their role in prevention of AMS is unclear.

Approximately 9-25 percent of individuals ascending to 2,000-3000m may develop AMS compared to 35-50 percent of those ascending to 3,500 - 4,500m. HACE and HAPE are extremely rare below 2,800m and seem to occur at an incidence of around 1-2 percent at altitudes between 4-5,000m

**Who is susceptible?**

Susceptibility is typically not related to age,

fitness or general health:

Risk factors relating to the trip include: the rate of ascent, absolute change in altitude and sleeping altitude. Treks with rapid ascent rate (e.g. the ascent of Mount Kilimanjaro in less than 7 days) are a cause for concern

Risk factors relating to the individual include: previous history of altitude illness, exertion on arrival to altitude and certain pre-existing cardiovascular conditions including heart or lung disease, blood clotting problems, high blood pressure.

**For further information see:**

**British Mountaineering Council** Hill skills: an introduction to altitude

Medex http://www.medex.org.uk/

**Prevention of Acute Mountain Sickness**

- **Ascend slowly:** The most important prevention for AMS is adequate acclimatisation and regular rest days. Avoid travel from altitudes of less than 1,200m to altitudes greater than 3,500m in a single day. Above 3000m avoid increasing sleeping elevation by more than 500m a day and ensure a rest day (at the same altitude) every three or four days.
- **Climb high, sleep low:** It's advisable to sleep below the highest point that you have reached
- **Keep well hydrated** and eat a light calorific diet.
- **Avoid immediate strenuous exercise** if arriving at an airport at altitude until you have acclimatised

**Treatment of Acute Mountain Sickness**

**Mild AMS** (e.g. breathlessness on exertion, loss of appetite, mild headache)

- Rest for 1-2 days at the same altitude unless symptoms worsening.
- If symptoms do not settle with rest, you should descend. **Never ascend if you have any symptoms of altitude sickness.**
- Treat with simple analgesics (e.g. paracetamol) for headaches.
- Avoid sleeping pills, narcotic pain relief (e.g. codeine) and alcohol.
- Drink plenty of fluids (4 – 5 litres per day); the dry air at high altitude may lead to dehydration that makes the symptoms of AMS worse.

**Severe AMS (**e.g. breathless at rest, persistent cough, mental confusion, severe headache, drowsiness)

**Immediate descent is necessary: failure to descend could be life threatening**
If descent is not possible e.g. because of adverse weather conditions:

- Oxygen and drug treatments may help
- Specially designed pressure bags (portable compression chambers) are sometimes available on specific expeditions.

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