

# Acute Mountain Sickness (AMS)

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As we ascend above 2000 meters, our bodies have to acclimatize to the decreasing amount of oxygen available. Failure to acclimatize may result in AMS. The onset of AMS is signalled by the symptoms set out below out mild AMS, and its progression to severe AMS under the headings HACE and HAPE. The best treatment for AMS is prevention as even mild symptoms may rapidly progress to the severe form of AMS (HACE and HAPE), which can be rapidly fatal. Any one symptom listed may indicate the onset of AMS.

## Preventive measures are as follows:

- Keep to a maximum ascend rate (height between sleeping places) of 300 meters per day above 2000 meters.
- Keep to a maximum ascent rate of 150 meters per day above 4000meters.
- Avoid dehydration. Drink sufficient water (2 – 3 liters or more per day at altitude) to keep your urine pale and plentiful.
- Avoid alcohol.
- Avoid strenuous exercise while acclimatizing.
- Do not ascend while experiencing any of the symptoms of mild AMS.
- Tent companions should use the ‘buddy system’ to keep on eye on each other.
- Diamox (acetazolamide) may be useful and/or appropriate in some situations (250 mg, 12 – hourly). Diamox will not mark the symptoms of severe AMS but may cause dehydration.
- Flying or driving to altitude is obviously risky. Consider using Diamox. Start 24 hours before the ascent (250 mg 12-hourly) and continue for 4 days or the rest of the time at altitude.
- Diamox is a Sulpha drug and though allergy is rare, a trial exposure in a controlled situation (GP’s surgery) is a appropriate for the people who have an anaphylactic response to Sulpha.
- Diamox will make the patients fingers and even lips tingle, warn them about this. If the tingling side is too severe, half the dose of Diamox to 125 mg 12 hourly.
- Medications that slow respiration (sleeping tablets, sedatives, strong painkillers and anti-histamines) increase the risk of AMS and should be avoided where possible at altitude.

## Mild AMS

### Mild AMS Symptoms:

- Headache
- Tiredness
- Disturbed sleep
- Loss of Appetite
- Nausea
- Dizziness, Light headedness
- Irritability
- Swelling of fingers or face is sometimes a sign of mild AMS.

Obviously some of the symptoms of mild AMS may be caused by other conditions such as exhaustion, hypothermia, dehydration, alcoholic hangover, viral infections, migraines, etc. Check the victim carefully and frequently for other problems. If in doubt, assume they are suffering from AMS.

## Treatment of Mild AMS

- Rest at the same altitude or lower until the symptoms clear. This usually takes one to three days.
- Ensure adequate hydration. Keep the urine pale and plentiful (2 to 3 litre or more of water per day may necessary).
- Check the victim carefully and regularly, especially during the night. Never leave someone suffering from AMS on their own, or with someone who does not understand the problem
- Ask after and look for signs of worsening AMS. Ask the victim to do the heel/toe walking test (see under the HACE for details), check their breathing and listen to their Chest
- Give Diamox 250mg 12- hourly and continue this for four days or the rest of the time at altitude
- Use paracetamol, aspirin or ibuprofen for headache

## Severe AMS

Mild AMS can become severe AMS if the symptoms and warning signs are ignored and the ascent is continued. All of the symptoms described in mild AMS may appear in severe AMS. One indication that serious AMS is developing is:

### **A decrease in urine output after descent.**

Other specific symptoms of severe AMS are as follows:

### **HACE (High Altitude Cerebral Edema)**

This is the accumulation of water in or around the brain. Check carefully for any of the following symptoms and signs:

- Any of the symptoms and signs described in mild AMS plus:
- Severe headache, often worse when lying down, not relieved by mild analgesics. *f*
- Nausea or vomiting which may be severe and persistent.
- Dizziness, loss of coordination, staggering, falling, inability to tie shoe laces, inability to do the “heel-to-toe walking test” (the victim is asked to take ten very small steps placing heel to toe as they go. Reasonable flat ground is necessary and the victim should not be steadied by anyone). If the victim cannot do this, they have HACE.
- Change in behaviour (e.g. irritability, aggression, apathy, etc.).
- Blurred or double vision, seeing haloes around objects.
- Loss of mental abilities (e.g. memory, arithmetic).
- Confusion, hallucinations, disorientation.
- Drowsiness, difficult to rouse, coma

Note: Any one of the above symptoms is highly suggestive to HACE and the victim should descend immediately. A low fever may be present with HACE. Meningitis, stroke or alcohol intoxication may be confused with HACE. If I doubt, call it HACE.

### **HAPE (High Altitude Pulmonary Edema)**

- This is the accumulation of water in the lungs. Check carefully for any of the following symptoms. Any of the symptoms and signs described in mild AMS plus Cough which may be dry at first and later produces frothy sputum that may be blood stained (pink or rust coloured)
- Severe breathlessness on exertion
- Breathlessness at rest (at rest normal respiration rate is 12-14 breaths per minute at sea level, about 14-18 at altitude)
- Blueness or darkness of face lips or tongue.
- Chest or abdominal pain.

- Severe fatigue.
- Wet sounds or crackles in the lungs on deep inspiration – sometimes this sounds like tearing paper. Place your ear on the bare skin on the victim's back, below the shoulder blades. Compare with the healthy person. These sounds may not be present in a person suffering HAPE this is known as dry HAPE.
- Drowsiness, difficult to rouse, coma.

Note:

Any one of above symptoms is highly suggestive of HAPE and the victim should descend immediately.

Note that in cases of HAPE a mild fever may be present, up to 38.5° C, and /or the victim may complain of a feeling of inner cold.

#### **Treatment of severe AMS (HACE and HAPE)**

- Descend immediately, at night if necessary.
- Descend as low as possible (at least 500 meters or 1500 ft).
- Do not wait for helicopters, medication or daylight to arrive, before descending.
- The victim should be accompanied by an experienced person who knows how to treat AMS and can speak the victim's language fluently.
- If available, give oxygen 6L/minute for 15 minutes, then 2L/minute.
- If the victim is turning blue or is lapsing into coma, give them E.A.R. (mouth to mouth resuscitation). Do not wait for them to stop breathing before doing this.
- Give Diamox™ 250 mg 12-hourly.
- Drugs such as nifedipine (for HAPE) and dexamethasone (for HACE) may help with symptoms of severe AMS. These drugs will not cure the condition but they may buy time in which to descend. The only treatment for severe AMS is descend.
- Nurse the victim sitting upright or reclining, as lying the victim flat will make them worse.
- Check for and treat dehydration and hypothermia.
- Keep the victim warm, as hypothermia makes HAPE worse.
- If descend is not possible, the use of the PAC will help alleviate the symptoms, at least temporarily, until the victim can descend. A pressure bag is not a substitute for going down, which is always the preferred treatment, but it will simulate a descent of approximately 2000 meters (6500ft.) lower than the altitude you are at. If the symptoms are severe or worsening the victim must descend after treatment in the PAC, or if descend is still impossible, they must be replaced in the PAC. *f* If someone has suffered from severe AMS and has recovered at lower altitude, experience suggests that re-ascending immediately will result in another attack of severe AMS.

Note:

Death from HAPE or HACE is usually due to rapid ascent, failure to take mild AMS seriously and delayed diagnosis of HACE or HAPE. Sending a victim down alone or with a companion who does not speak their language and who does not know the treatment of AMS is another common cause of death