

HYPOOTHERMIA

Hypothermia is a common and potentially serious problem amongst various groups in the community such as bush-walkers, water sports enthusiasts and the elderly. It may be encountered amongst cavers who should be alert to the early signs amongst members of their party.

There is no real consensus on the definition of hypothermia but a useful guide is:

Mild hypothermia	34 - 35°C
Moderate hypothermia	30 - 34°C
Severe hypothermia	< 30° C

The underlying cause and the duration of the hypothermia may influence treatment and the type of situation met by cavers will usually be a very acute immersion hypothermia or a slightly less acute exhaustion/exposure hypothermia so these are the only ones I will consider.

Body temperature is normally regulated by balancing metabolic heat production plus the more or less optional heat production from muscular activity against heat losses. Some of these losses are regulated automatically by the autonomic nervous system, eg sweating and vasoconstriction and some are regulated by voluntary behavioural changes, e.g. seeking shelter, wearing wet suit etc. When the limits of heat production or insulation are exceeded, hypothermia may occur.

Hypothermia is often mistaken for fatigue when it is the result of exposure/exhaustion. Initially, there is shivering and tiredness combined with apathy, impaired judgement and slow progress. Then the victim repeatedly stumbles and falls and speech may be slurred and incoherent. Hallucinations are common.

Finally, there is complete collapse and they are noted to be cold and rigid with a slow heart rate.

If hypothermia is suspected, management should include:

- Assessment of Airway, Breathing, Circulation.
- Diagnosis.
- Gentle handling of victim.
- Prevention of Further Heat Loss
- Provision of additional heat.
- Evacuation.

ABC is always first priority in first aid but in hypothermia there is a trap; a detectable pulse is not necessarily present, heart rate may be only 6/min and respirations very shallow with fixed dilated pupils. Without an ECG, it may be very difficult to detect life and the victim is said to be in the "metabolic ice-box" and is more or less stable. At this stage, attempts at CPR may cause ventricular fibrillation (in-coordinate action of the heart without an output) which is resistant to treatment until the heart is warmed > 29°C.

This decision - whether or not to commence CPR - is very difficult and should not be made precipitately.

DIAGNOSIS

High index of suspicion in cold wet windy conditions, especially if the victim is exhausted, lost or poorly equipped.

The signs and symptoms of hypothermia have already been alluded to but confirmation comes with a thermometer reading. Temperatures can be taken in the mouth which is very unreliable, in the armpit (axilla) which is less unreliable and tends to read 1–1.5°C below core temperature or in the rectum or oesophagus. These last two are the most reliable but have their drawbacks in the practicalities of measuring at these sites.

Thermometers required are, in increasing order of sophistication (and expense!) – hands, low reading mercury/glass, digital electronic and thermistor.

GENTLE HANDLING

Cold hearts (<29°) are very irritable and any rough handling of the victim may cause ventricular fibrillation. Careful thought must be given even to the removal of wet clothes and particularly to rough transportation.

PREVENTION OF FURTHER HEAT LOSS

This is essential. It includes provision of shelter immediately, insulation from cold ground, replacement of wet with dry clothes, insulation of head and of body with sleeping bag and plastic bag. Attempt to reduce respiratory heat loss without suffocating the victim, e.g. a loose scarf around the face.

PROVIDE ADDITIONAL HEAT

The decision whether to rewarm on-site is complex. If evacuation can be rapid and smooth, it may be better to leave the victim in the "metabolic ice-box" until he reaches hospital. Otherwise the options range from warm (20°C) not hot shelter, warm drinks and food, all suitable options for the mildly hypothermic conscious victim. Body to body contact, heat packs in the armpits, groins and neck and airway rewarming may also be used in the more severely affected victim.

EVACUATION

As already mentioned, this should only be attempted if it can be achieved relatively smoothly and quickly. USA experience suggests 6 hours as a maximum. Remember that there must be frequent opportunity for reappraisal of the victim during the evacuation.

Severely hypothermic victims should always be resuscitated unless there is an obviously lethal injury, rescuers are endangered or chest wall compression is impossible.

No hypothermic victim should be considered dead until he is warm and dead!