

Hypothermia Recognition and Treatment.

"No previously healthy person should die of hypothermia after they have been rescued and treatment has been started."

Cameron C. Bangs, M.D. The Mountaineers 1986.

The fundamental questions are simple:

1. If effective treatment technology had been available, would an individual have survived ?
2. Are a significant number of people dying because attending personnel are not knowledgeable, or not equipped with current technology?
3. If a hypothermic victim is alive when rescued but dies during recovery, and there is no other significant trauma or disease, does this suggest that death may have resulted from either:
 - i) inappropriate or ineffective treatment, or
 - ii) no treatment at all ?

"Rescuers have an important role in the first aid medical treatment of victims"

(World Congress on Drowning)

Although no accurate statistics are available, one cannot fail to be concerned by the mortality rate in the post-rescue period.

It has been stated that there is no longer any excuse for hypothermia deaths; the knowledge and the technology needed to cope with hypothermia exist, so that treatment is now a matter of preparedness with the application of up-to-date techniques and equipment.

The recommended treatment of hypothermia in the field is core rewarming to prevent post-rescue collapse.

"Treatment of hypothermia starts in the field. Many rescuers and first-aid providers do not have equipment to institute rewarming with warm, humidified oxygen, and warm IV-fluids, although these methods should be initiated to help prevent (core) temperature afterdrop". ([link to Res-Q-Air equipment](#))

Article: ([Journal of the American Medical Association](#))

Many hypothermia cases can be successfully treated, providing that treatment starts immediately upon rescue and is continued during transportation to a medical facility.

What is the major injury rescue specialists face?

"Without a doubt hypothermia" says Bob Ayres, Canadian Coast Guard Rescue Specialist Coordinator " . . . due to the cold waters on our coast we have adapted specialized equipment, including inhalation rewarming units known as the Res-Q-Air, to stabilize and begin warming in the field".

TREATMENT IN THE FIELD

BODY SIGNS/SYMPTOMS TEMP. (rectal)

37.5°C NORMAL

36 FEEL COLD

Seek dry shelter, replace wet clothing with dry including socks, gloves, hat, cover neck, insulate whole body including HEAD from cold. Exercise but avoid sweating. External warmth (bath, fire) ONLY if CORE TEMP. above 35°C. Warm sweet drinks and food (high calories).

35 SHIVERING

BODY CORE TEMPERATURE BELOW 35°C = HYPOTHERMIA = HOSPITAL

34 IRRATIONAL
CONFUSED
(may appear drunk)

NO EXERCISE, HANDLE GENTLY, REST.
NO EXTERNAL WARMTH (except to chest, trunk, eg. Hiebler Jacket).
Warm sweet drinks and calories.
Internal warming via warm moist air (exhaled air, steam) or warm moist oxygen (40 - 42°C at mask).

33 MUSCLE STIFFNESS

Monitor pulse, breathing. Restrict all activity, lie down with feet slightly raised.

32 SHIVERING STOPS, COLLAPSE. TRANSFER TO HOSPITAL. URGENT.

31 SEMI CONSCIOUS

Nothing by mouth. Check airway remains open.

30 UNCONSCIOUS

No response to painful stimuli

May tolerate plastic airway, put in recovery position, check airway, turn every 2 hours to protect skin, monitor pulse and breathing.

29 SLOW PULSE AND BREATHING

Slow mouth-to-mouth breathing, at victim's own rate (may be very slow).

28 CARDIAC ARREST

No obvious pulse or breathing
Pupils dilated

Check airway. CPR, with mouth-to-mouth breathing. Aim for normal CPR rates of 12-15 breaths/min. and 80-100 compressions/min. but slower rates of 6-12 breaths/min. and 40-60 compressions/min. may be adequate. Continue for as long as you can.

BELOW 28°C. NO VITAL SIGNS, COLD. DO NOT GIVE UP TREATMENT.

NOTE: NOT DEAD UNTIL WARM AND DEAD!

Avoid rapid rewarming and **HANDLE GENTLY AT ALL TIMES.**

Core temperature may lag behind skin temperature and continue to drop, so keep monitoring.



TREATMENT IN HOSPITAL

CAUTION



No re-exposure to cold
Exercise to generate body heat but no sweating.
Warm bath.
Warm sweet drinks, calories
Keep warm for several hours.
Watch for drop in temperature.

DO NOT massage cold limbs.
DO NOT give alcohol or coffee.

CHECK FOR OTHER INJURIES. MINIMUM STAY – 48 HOURS

Watch out for late cardiac arrhythmia.
Warm only trunk, chest.
Give warm, sweet drinks.
Warm moist air or warm moist oxygen,
40-42°C at mask.
e.g. Warm IV fluids e.g. Dextrose/Saline 5%
at 37°C, 50% Dextrose, 20ml.
Monitor pulse, respiration, ECG.

NO exercise.
NO external warmth except Hiebler
warm water type jacket to trunk and
chest.
NO cold air, oxygen.
NO cold drinks.
DO NOT overload with IV fluids.

JOLTING DURING TRANSPORT MAY CAUSE CARDIAC ARREST.

Nil by mouth except glucose jelly.
Check airway, recovery position.
Turn every 2 hours to protect skin.

NO food or drink

Oropharyngeal airway
Slow synchronous mouth-to-mouth or mask.
Defibrillate if necessary. Intubate if unable to
maintain airway. Ventilate with 50% humidified
oxygen at 42°C, CPR at 6-12 ventilations/min. and
40-80 compressions/min. Warm peritoneal lavage
(standard dialysate as fast as it will flow), or Arterio-
venous by-pass warming.

Endotracheal intubation may precipitate
ventricular fibrillation.
NO drugs unless CORE temp. above
32°C. e.g. Lignocaine.

CONTINUE TO TREAT

DO NOT GIVE UP

Monitor Core temp.
Monitor biochemistry (potassium, sugar, acidity)
and correct cautiously.

DO NOT defibrillate until CORE temp.
above 30°C.

NOTE: CORE temp. lags behind skin temp, watch out for after-drop. Other complications may arise during rewarming (e.g. cardiac, fluid balance).

Treating Hypothermia: A life-saving skill

The growing popularity of outdoor recreation has resulted in greater demand for an effective on-site method for treating hypothermia. Other than for mild cases, the most effective and safest treatment for all levels of hypothermia is the addition of heat to the body core, rather than via the periphery.

The most important phase of treatment is the prevention of post-rescue collapse during the first 30 minutes following rescue, and during transportation to a medical facility.

Phases and Treatment of Hypothermia.

After-drop

A further cooling of core temperature occurs after the victim is removed from the cold environment. This after-drop is often responsible for post-rescue collapse.

Pre-hospital stabilization

Preventing respiratory heat loss and progressive cooling, of the heart through the tissues is essential. This cooling if not arrested, can lead to ventricular fibrillation of the heart. Patients who are unconscious, with a temperature below 30°C or 80°F, may not respond to defibrillation. Thermally stabilizing a patient with suitable equipment is necessary, both before transportation and enroute to the hospital to prevent additional cardiac complications.

Core rewarming

This is the most effective treatment for all cases of moderate to severe hypothermia, whether treatment occurs in the hospital or in the field.

Inhalation rewarming

As the only non-invasive hospital treatment suitable for active core rewarming in the field, inhalation rewarming donates heat directly to the head, neck, and thoracic core (the critical core) through inhalation of warm, water-saturated air at 43 - 45°C (107 - 122°F). This method also warms the hypothalamus, the temperature regulation center, the respiratory center, and the cardiac center at the base of the brainstem. In many cases, this rewarming of the central nervous system at the brainstem reverses the cold-induced depression of the respiratory centers and improves the level of consciousness.

Beside this strategic donation of heat, inhalation rewarming also eliminates. .

Respiratory heat loss

This accounts for 10% to 30% of the body's heat loss. This is particularly important in rescue situations where the ambient air is cold (cooling of the core through respiration).

In summary, inhalation rewarming is highly effective in providing "basic life support" through thermally stabilizing the core and brainstem temperatures. It is safe for treatment for all levels of hypothermia, but is particularly important for severe cases, because insulating alone (blankets), does not prevent further cooling of the core.

The first half hour during rescue is the most critical phase of hypothermia management!

Avoid having the victim assist with their own rescue!

Muscular activity by the hypothermic victim pumps cold peripheral blood from the arms and legs into the central circulation causing the core temperature to drop even further. Gentle handling is critical! A cold heart is particularly susceptible to ventricular fibrillation, and some victims may suffer fatal ventriculation when jolted about during initial handling or transportation.

" The inhalation rewarming method is now our first choice in the re-warming treatment of all stages of hypothermia in the wilderness environment. " (Dr. Ian Taylor, Medical Adviser to the North Shore Rescue Team, Vancouver B.C.).

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HYPOTHERMIA SCENARIOS

OUTDOOR RECREATION:

Exposure to hypothermia in wilderness recreation, includes canoeing, kayaking, marine, and ice sports fishing, sailing (immersion hypothermia), down hill and cross country skiing, climbing, hiking, back packing, hunting, skidoo and diving. Remote locations, no medical assistance.

SEARCH AND RESCUE:

Exposure hypothermia on land, fresh and salt water usually in remote areas. Land scenarios include mountaineering, caving, avalanche and crevasse rescues. Water accidents include recreation and commercial activities as well as disaster situations, such as flooding, mud slides, earthquakes and transportation accidents. Organizations include volunteer SAR groups, Ski patrol, Military, Fire dept., Divers, Police, Coast Guard and Ambulance personnel.

MARITIME COMMERCIAL:

Cold water immersion hypothermia. Usually in remote areas. Tendency to be mass events, Spirit of Free Enterprise capsizing, the Lakonia, Titanic etc. Others include: commercial fishing, merchant marine, ferries, cruise ships, offshore oil rigs, and diving.

MILITARY:

Peacetime hypothermia incidences are low. Experience shows that war-time incidence increases dramatically. Remote and adverse conditions, probability of trauma related hypothermia is large (shock/immobility). Cold and/or wet environments. History demonstrates that cold conditions can affect outcome of battles. Navy: on board ship and lifeboats, Army field hospitals and ambulances, company medics. These may also respond to natural disasters.

AMBULANCES:

Pre-hospital contact with all levels and causes of hypothermia, mva's, trauma, immersion, transfer from rescue, drug and alcohol abuse, diabetes related, hypothermia in the elderly. Remote areas are typical for long transportation times.

HOSPITALS:

Treat all levels of hypothermia, urban (alcohol/drugs) elderly, infant incubators, trauma etc. Significant difference between large urban hospitals and small clinics. The last are less likely to have complex facilities to cope with treatment for hypothermia.. This is not recognized in the majority of cases.