

STAGE THE HYPOTHERMIA *the stage decides the rewarming method*

Stage	Core temperature	Clinical picture and approach
Mild (HT I)	32–35°C	Conscious and shivering. Passive external rewarming — remove wet clothing, insulate, warm environment, warm sweet drinks. Shivering is an effective heat source; preserve it.
Moderate (HT II)	28–32°C	Impaired consciousness, shivering stops. Active external and minimally invasive rewarming — forced-air blankets, warmed intravenous fluids. Cardiac monitoring; handle gently.
Severe (HT III)	24–28°C	Unconscious, vital signs present but may be barely detectable. Active internal rewarming, ICU care, consider extracorporeal support.
HT IV	< 24°C	Cardiac arrest or apparent death. Extracorporeal life support is the treatment.

HANDLE THEM GENTLY *the single most under-appreciated point*

WHY IT MATTERS

The cold myocardium is **exquisitely irritable**. Rough handling, sudden movement, or even careless positioning can precipitate **ventricular fibrillation**, which is then **refractory to defibrillation until the patient is rewarmed**. Move the patient horizontally and minimize jostling.

AFTERDROP

Core temperature can **continue to fall after rescue** as cold peripheral blood returns to the core. **Rewarm the core preferentially**, avoid vigorous limb massage, and keep the patient horizontal — standing a rescued patient up can precipitate collapse.

HYPOTHERMIC CARDIAC ARREST *prolonged resuscitation is justified here*

- Check for signs of life for a full 60 seconds** — bradycardia and shallow respiration can be profound and easily missed. If there is any perfusing rhythm, **do not start compressions**, which risk precipitating VF.
- Continue CPR and rewarm. Extracorporeal life support is recommended as first-line for hypothermic cardiac arrest**, with **veno-arterial ECMO** preferred for its lower anticoagulation requirement and ability to sustain circulation. **There is no absolute contraindication to ECLS rewarming below 30°C.**
- Modify ACLS.** Below about **30°C**, withhold repeated drug doses and limit defibrillation attempts — the cold heart responds poorly and drugs accumulate. Resume standard intervals as the temperature rises.
- Do not stop early.** Survival with good neurological outcome has been reported from core temperatures as low as **13.7°C** and after **nearly 7 hours** of hypothermic arrest. **"Not dead until warm and dead."**
- Markers of non-survivability** that support stopping: obvious lethal injury, a chest wall too frozen to compress, avalanche burial with an obstructed airway and asystole, and a **markedly elevated serum potassium** — a value above roughly **12 mmol/L** is widely used as indicating death rather than salvageable hypothermia. Prognostic tools such as the **HOPE score** help guide the decision to initiate ECLS.

DROWNING *a hypoxic problem — ventilation comes first*

RESUSCITATION IS DIFFERENT

The **primary insult is hypoxia**, so drowning resuscitation **starts with rescue breaths** and prioritizes oxygenation and ventilation over the usual compression-first sequence. **Fresh versus salt water makes no practical difference** to management, and abdominal thrusts to "clear water" are **not indicated** and cause aspiration.

AFTER THE RESCUE

Watch for **delayed pulmonary deterioration** — symptomatic patients need observation, as acute lung injury can evolve over hours. **Give oxygen and consider positive pressure. No prophylactic antibiotics or steroids.** Look for the **cause**: seizure, arrhythmia, long QT, intoxication, hypoglycemia, trauma or non-accidental injury. **Truly asymptomatic patients with a normal examination and saturations after a period of observation may be discharged.**

ASK WHY THEY GOT COLD *most inpatient hypothermia is secondary to something else*

Cause	Detail
Impaired thermogenesis	Hypoglycemia · hypothyroidism, including myxedema coma · adrenal insufficiency · malnutrition and cachexia. Check a glucose, TSH and cortisol in unexplained hypothermia — these are treatable and easily missed.
Impaired thermoregulation	Alcohol (vasodilates and impairs shivering and judgement) · sedatives and opioids · stroke or hypothalamic injury · spinal cord injury · advanced age and frailty.
Increased heat loss	Sepsis — hypothermia is a marker of severe sepsis and carries worse prognosis than fever · burns · environmental exposure · iatrogenic from cold fluids, prolonged surgery or unwarmed resuscitation.
ECG changes to recognize	Osborn (J) waves at the QRS-ST junction, bradycardia, prolonged intervals, and a susceptibility to atrial then ventricular arrhythmias . Atrial fibrillation is common and usually reverts on rewarming without treatment .
Watch on rewarming	Rewarming collapse from vasodilation as peripheries open up — anticipate and give volume. Also hyperkalemia, hypoglycemia and coagulopathy , and note that coagulation tests run at 37°C will look falsely normal in a cold patient.

PEARLS & PITFALLS

- Handle gently.** Rough movement of a cold heart precipitates VF that will not respond until rewarmed.
- Feel for a pulse for a full minute** before declaring arrest — and do not start compressions on a perfusing bradycardia.
- Refer for ECLS in hypothermic arrest.** It is first-line, and outcomes from extreme temperatures can be excellent.
- Use a low-reading core thermometer** — standard thermometers do not read low enough, and oral or tympanic readings are useless here.
- In drowning, ventilate first.** The arrest is hypoxic, not primarily cardiac.
- Look for the precipitant** — hypothermia and drowning are often the consequence of something else, from intoxication to arrhythmia to sepsis.