

West Midlands protocol for severe hypothermia – explanatory notes

Severity of hypothermia by core body temperature

Mild 35 – 32°C
Moderate 32-28°C
Severe <28°C

IKAR – MEDCOM on-site staging of hypothermia

Stage 1 – Conscious, shivering. (35-32°C)
Stage 2 – Impaired consciousness, no shivering. (32-28°C)
Stage 3 – Unconscious. (28-24°C)
Stage IV – Apparent death (24-13.7°C)

Which patients?

This protocol applies to anyone who is suspected either by environmental or clinical findings of having significant hypothermia.

Significant European and Scandinavian experience has shown that good recoveries can be made from apparently hopeless situations. Patients have made full recoveries after hours of CPR but only with the appropriate care. This is deemed to be extra-corporeal (circulation and warming of blood outside of the body) circulation, either with ECMO or cardio-pulmonary bypass. ECMO is the modality of choice causing less trauma to blood and requiring less anti-coagulation.

Temperature measurement.

Is vital to knowing how at risk the heart is of arrhythmia is, or if in cardiac arrest what the possible prognosis is. The rectal route is unreliable, oesophageal probes can trigger cardiac arrest. Oral or tympanic are the modalities of choice.

ECG rhythm

A normal looking rhythm compatible with a cardiac output is likely to suggest such but with a carotid pulse too weak to feel. These patients should be treated as having an output and transferred as per protocol.

Patient movement

Patients must be treated with utmost care. The smallest movement can precipitate VF. Never raise the legs as the sudden return of cold blood to the core can have the same effect.

Resistant VF

At temperatures of less than 30°C defibrillation is very unlikely to be successful. Repeated attempts will likely damage the myocardium and should not be attempted. Once the patient is in asystole, an improvement in rhythm is very unlikely until the heart is rewarmed.

Pre-hospital warming

If mild, hypothermia should be treated aggressively with dry clothes/blankets, a warm environment and hot drinks. However once the temperature reaches 30 even the act of removing clothing could cause heart rhythm disturbance. Consideration should be made to moving patient as little as possible, leaving in wet clothing and expediting transfer to ECMO unit.

CPR

Should only be started when it can be continued. Mechanical devices are ideal if available. Hypothermia confers significant neuro-protection with brain metabolism falling by 6-10% every degree below 35°C. Complex heart operations of up to an hour are routinely carried out with no circulation at a temperature of 22°C. Consequently delays in starting CPR are not as disastrous as imagined.

Airway management

The patient in cardiac arrest should have an ETT or LMA inserted for transfer. The decision in the severely hypothermic casualty not in cardiac arrest is more difficult. Airway manipulation may precipitate cardiac arrest, take great care with the use of airway devices.

Discussion with ECMO centres

This should be done at the earliest possible time via the ECMO co-ordinators at the Royal Leicester and Wytneshawe. Medical advice can be sought from the doctors overleaf in the interim. It may be possible for a mobile ECMO unit to be moved to the patient at a convenient DGH. Cardiopulmonary bypass is an alternative to ECMO and is available at all major trauma centres.