

# Accidental Hypothermia in the Elderly.

## Definition and Classification.

Hypothermia can be defined as an unintentional fall in core body temperature\* below 35<sup>o</sup>. It can be further classified as:

- Mild – core temperature 32.2 – 35<sup>o</sup>C.
- Moderate – core temperature 28 – 32.2<sup>o</sup>C.
- Severe – core temperature below 28<sup>o</sup>C

\*Monitoring sites for core body temperature include distal oesophagus, tympanic membrane, nasopharynx and pulmonary artery.

## Risk Factors for Development of Hypothermia.

**Old Age** - altered physiology and impaired temperature recognition.

**Medications** - especially neuroleptics.

**Alcohol or Recreational Drug Use.**

**Associated medical conditions** - any acute illness can potentially provoke hypothermia in the elderly. Specific diagnoses to consider include sepsis (all sources), acute MI or stroke and metabolic (hypothyroid, hypoadrenalism).

**Environmental and Social** - colder temperatures and social isolation increase risk.

## Clinical Assessment.

Hypothermia is an emergency and patients may be critically unwell due to either the hypothermic state or the underlying precipitating illness. Initial evaluation should include assessment of ABCDE before moving onto a more detailed assessment.

### **History:**

Identify risk factors identified above. Pay specific attention to:

1. History suggesting cardiac event or source of sepsis\*
2. Patient's premorbid functional state (essential for planning of treatment, escalating care and discharge).

\*As patient may be confused or comatose collateral history should be sought.

## Examination:

Goals of clinical examination are confirmation of diagnosis, establishing patient stability and identification of precipitant. Look for:

1. ABCDE – respiratory depression, cardiac arrhythmia, hypotension (common in hypothermia and may be acutely life threatening).
2. Shivering – may be absent in moderate / severe cases.
3. Skin – may be mottled. Areas such as axilla and abdomen may feel cold to touch.
4. Signs of sepsis – cellulitis, pneumonia, peritonitis.
5. Signs of neurological disease – unilateral weakness, Parkinsonism (caution as muscle tone may be increased and plantars extensor in hypothermia).
6. Signs of underlying medical conditions e.g. hypothyroidism (caution as hypothermic patients develop facial puffiness that may mimic myxoedema).
7. Consequences of falls including fractures, tissue necrosis, ulcers etc.

## Investigations:

Required investigations include:

- **FBC and CRP** - ? sepsis.
- **U+E** – dehydration, ARF.
- **Blood Glucose** – essential in all critically ill patients. May be high initially due to ‘stress response’ but may drop with rewarming.
- **Amylase** – pancreatitis potential cause or complication.
- **Muscle Enzymes** – CK elevated in rhabdomyolysis.
- **Troponin – T** – to exclude myocardial damage.

- **Cultures** – blood and urine as a minimum. Swabs and sputum as indicated.
- **TSH, Cortisol** – possible underlying endocrinopathy (especially if recurrent presentation).
- **CXR** – identify focus of sepsis.
- **ECG** – various abnormalities associated with hypothermia.
  - Arrhythmias – tachycardia, bradycardia, VF / VT.
  - Osbourne / J – waves.
  - Underlying precipitant – signs of acute ischaemia.
- **ABG** – not necessary to correct for body temperature as blood gas warmed to body temperature prior to analysis.

## Initial Management.

### Supportive care :

- Space blanket (all patients).
- Oxygen (warmed and humidified).
- Antibiotics if features of sepsis [guided by clinical symptoms, signs and trust policy, otherwise Tazocin (or clarithromycin in penicillin allergic patients)].

## Rewarming Strategies.

Little evidence exists regarding the best way of re-warming patients.

**Passive External Rewarming** – patient insulated against heat loss and allowed to warm themselves (e.g. space blanket). Should be used in all hypothermic patients.

**Active External Rewarming** – external heat applied to patient in non-invasive method (e.g. 'Bair Hugger').

**Active Core Rewarming** – these methods depend on availability and expertise. Includes:

1. Heated infusions and warmed humidified oxygen (should be used in **all** patients considered for active external rewarming).
2. Heated lavage (gastric, bladder, peritoneal etc). Specialist use only.

**Extracorporeal Blood Rewarming** – e.g. haemodialysis, venovenous rewarming and cardiopulmonary bypass. Involvement of consultant essential.

Patients with moderate / severe hypothermia should be re-warmed carefully, aiming for an increased in core temperature of  $\sim 1^{\circ}\text{C}$  per hour.

Avoid rapid external rewarming without core rewarming as can provoke rapid peripheral vasodilatation which can precipitates relative hypovolaemia and cardiac arrhythmias.

Avoid unnecessary invasive procedures – can precipitate ventricular arrhythmias.

## **Monitoring.**

Degree depends on clinical severity. Minimum should include:

- Hourly temperature, BP, pulse, respiration rate, GCS and Blood Glucose (BM).
- Cardiac monitoring.
- Regular assessment of pH and pCO<sub>2</sub> (suggest 2 hourly until temperature  $>35^{\circ}\text{C}$ ).

## **Complications.**

Numerous complications including

- Paralytic ileus.
- Gastric dilatation
- Respiratory failure
- Cardiovascular collapse

- Oliguria
- Gastric ulceration
- Pancreatitis
- Aspiration pneumonia

## **Escalation of Care and Resuscitation.**

The appropriateness of level 2 / 3 care should be made along similar guidelines to other acute medical conditions, and should be discussed with senior clinicians. For most cases, ITU care is not appropriate as it does not alter outcome.

Resuscitation should be undertaken as per ALS protocols. Severely hypothermic patients may be relatively protected against neurological sequelae, and thus resuscitation attempts should not be aborted until core temperature reaches  $>30^{\circ}\text{C}$  without signs of life. Defibrillation may not be effective at very low core temperatures.

## **Discharge Planning.**

Involvement of elderly care multidisciplinary team essential to identify precipitant cause(s), and to address environmental and functional issues.