

# 2-8 Peri-operative hyperthermia v.1

If prolonged or  $\geq 39^{\circ}\text{C}$  this is a clinical emergency: permanent organ dysfunction and death can result.

Treatment depends on the aetiology. Distinguish early between:

- Excessive heating (most common)
- Inadequate dissipation of metabolic heat
- Excessive heat production
- Actively maintained fever

## START

- 1 Call for help. Inform theatre team of problem. Measure and record core temperature.
- 2 Remove cause of hyperthermia including any insulation and heating devices.
- 3 Make an initial diagnosis of the cause as this affects further management (Box A):
  - Actively maintained fever (typically cold peripheries, vasoconstricted) OR
  - Non-febrile hyperthermia (typically warm peripheries, vasodilated)
  - Suspect malignant hyperthermia crisis or neuroleptic malignant syndrome? ( $\rightarrow$  3-8)
- 4 Start active cooling WITH CAUTION if core temp  $\geq 39^{\circ}\text{C}$  (stop once below):
  - Reduce the operating room ambient temperature.
  - Cooling jackets or blankets.
  - Ice packing in groin, axillae and anterior neck.
  - Bladder, gastric or peritoneal lavage with boluses  $10 \text{ ml.kg}^{-1}$  iced water.
- 5 Give benzodiazepines to treat shivering and consider tracheal intubation and muscle paralysis if core temperature  $\geq 40^{\circ}\text{C}$
- 6 If fever, give antipyretics such as paracetamol and treat underlying cause if known.
- 7 Give chlorpromazine if serotonin syndrome is suspected (Box B)
- 8 Monitor and manage life-threatening complications especially:
  - Hyperkalaemia, hypoglycaemia, acidosis
  - Hypotension ( $\rightarrow$  2-4), malignant hypertension
  - Altered conscious level, convulsions
  - Coagulopathy and disseminated intravascular coagulation

### Box A: CAUSES OF HYPERTHERMIA

#### COMMON

- Excessive insulation, high ambient temperature, external warming devices, especially infants and children (most common)
- Surgical devices, e.g. HIFU, diathermy, radiotherapy
- Prolonged epidural anaesthesia
- Sepsis ( $\rightarrow$  3-14) e.g. during manipulation of a urological device
- Blood transfusion
- Allergic reaction / anaphylaxis ( $\rightarrow$  3-1)

#### Drug induced:

- Neuroleptic malignant syndrome (e.g. haloperidol and other antipsychotics)
- Malignant hyperthermia crisis (late sign) ( $\rightarrow$  3-8)
- Serotonin syndrome (cocaine, amphetamine, phencyclidine, MDMA)
- Anticholinergic syndrome (tricyclic antidepressants, antipsychotics, antihistamines)
- Sympathomimetic syndrome (cocaine, MDMA, amphetamines)

#### Toxic:

- Radiologic contrast neurotoxicity
- Alcohol withdrawal

#### Endocrine:

- Thyrotoxicosis
- Pheochromocytoma

#### Neurologic:

- Meningitis
- Intracranial blood
- Hypoxic encephalopathy
- Traumatic brain injury

### Box B: CHLORPROMAZINE DOSE

Chlorpromazine (Largactil) 25-50 mg **i.m.** 6-8 hourly. Caution in elderly.

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The ultimate judgement with regard to a particular clinical procedure or treatment plan must be made by the clinician in the light of the clinical data presented and the diagnostic and treatment options available.