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| 3-8 Malignant hyperthermia crisis v.2 |
| Unexplained increase in ETCO2 AND tachycardia AND increased oxygen consumption. Temperature rise is a late sign.MH is rare. Always consider other, more common causes of hyperthermia (see 2-8 Peri-operative hyperthermia). |

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| Box A: ELIMINATE TRIGGER DRUG |
| * Turn off vaporisers and remove from anaesthesia workstation
* Set fresh gas flow to 100% oxygen, maximum flow
* Hyperventilate (2-3 x normal minute ventilation)
* Place activated charcoal filters on both limbs of the breathing circuit
* Change soda lime and breathing circuit if/when feasible (not a priority)
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 START.

❶ Call for help and inform theatre team of problem, note the time.

❷ Aim to abandon or finish surgery as soon as possible.

❸ Call for MH treatment pack/dantrolene and cardiac arrest trolley.

❹ Maintain anaesthesia with TIVA, neuromuscular block with non-depolarising drug.

❺ *Allocate enough team members to perform ❻, ❼ and* ❽ *simultaneously:*

❻ **Eliminate trigger drug (Box A).**

❼ **Give dantrolene (Box B).**

❽ **Begin active body cooling (Box C)**

❾ Additional monitoring: invasive BP, CVP, core and peripheral temp, urine output

❿ Send urgent samples for arterial blood gases, U&E, glucose, FBC, coagulation, urinary pH, creatine kinase (peak 12-24h) and repeat as indicated.

⓫ Seek and treat complications (Box D).

⓬ Continue ventilation and plan admission to critical care. Further dantrolene may be needed. (Ensure plan exists to counsel patient and family and refer Leeds MH Unit)

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| Box B: DANTROLENE |
| * Delegate mixing – it is time and labour intensive
* 2-3 mg.kg-1 immediate i.v. bolus (Adult approx. 200 mg)
* Repeat 1 mg.kg-1 every 5 mins, until ETCO2 <6 kPa and temp <38.5C
* Pause and observe
* Repeat 1 mg.kg-1 to maintain ETCO2 <6 kPa and temp <38.5C, even if exceeds ‘maximum’ dose 10 mg.kg-1
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| Box C: ACTIVE COOLING |
| * Turn off active warming
* Apply ice to axillae and groins
* Use cold i.v. fluids
* Consider cold peritoneal lavage
* Other cooling methods according to need and availability: surface cooling devices, intravascular devices, extracorporeal heat exchange
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| EMERGENCY HELP |
| Emergency hotline 07947 609601 or 0113 243 3144UK MH Registry website: [www.ukmhr.ac.uk](http://www.ukmhr.ac.uk) |

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| Box D: COMPLICATIONS AND OUTLINE TREATMENTS |
| Metabolic acidosis: Sodium bicarbonate 50 mmol (50 mL of 8.4% solution) if pH <7.2 despite hyperventilationHyperkalaemia: Sodium bicarbonate 50 mmol (50 mL of 8.4% solution); Glucose (50 mL of 50%) with insulin 10 IU; Calcium 0.1 mmol.kg-1 (in extremis)Myoglobinuria: Forced alkaline diuresis (aim UOP >2mL.kg-1; urine pH >7)DIC: FFP, cryoprecipitate, platelets Tachyarrhythmias: Amiodarone, β-blockersCompartment syndrome: surgical decompressionAVOID Calcium channel blockers (interaction with dantrolene) |

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