

Anaesthetist 1 - Resuscitation	Anaesthesia Assistant	Dantrolene	Anaesthetist 2 - Lines and investigations	Cooling	Logistics	Surgical Team
<p>Dantrolene 2.5mg/kg every 10-15 minutes</p> <p>Total intravenous anaesthesia (TIVA)</p> <p>Hyperkalaemia management</p> <p>Arrhythmia management</p> <p>Renal Protection</p>	<p>Collect MH box</p> <p>Arterial line set-up</p> <p>Central line setup</p> <p>Restock resuscitation and TIVA drugs</p>	<p>20mg/vial</p> <p>2.5mg/kg every 10-15 minutes</p> <p>Reconstitute with 60mls sterile water</p>	<p>Arterial Line</p> <p>Frequent blood tests: ABG U&amp;E CK</p> <p>Coagulation profile</p> <p>Urine Myoglobin</p> <p>Central venous line</p> <p>Anaesthetic record</p>	<p>Collect ICE</p> <p>Collect refrigerated IV fluids and insulin</p> <p>Collect defibrillator</p> <p>Cover all exposed parts with ICE</p>	<p>Call for:</p> <p>Additional anaesthetists</p> <p>Additional dantrolene</p> <p>Arrange transfer to ICU and call for ICU bed</p>	<p>Complete or abandon surgery</p> <p>Insert urinary catheter</p> <p>Expose patient to aid cooling</p>

## COORDINATORS OVERVIEW

revised August 2018

# ANAESTHETIST 1: RESUSCITATION

## **DANTROLENE**

2.5mg/kg every 10-15 minutes IV until signs of hypermetabolism (acidosis, pyrexia, muscle rigidity) are resolving

Do not delay dantrolene to insert a central line

## **MAINTENANCE OF ANAESTHESIA**

Consider Propofol maintenance +/- benzodiazepine

Intubate to support hyperventilation (dantrolene is a muscle relaxant)

## **HYPERKALAEMIA MANAGEMENT**

Hyperventilation

Insulin 0.15 units/kg + 0.5 ml/kg 50% dextrose as rapid infusion (10 units insulin in 50 ml 50% dextrose) in adults

Calcium Chloride (CaCl<sub>2</sub>) – 0.1 ml/kg OR Calcium Gluconate (10%) 0.3 ml/kg

## **ARRHYTHMIA MANGEMENT**

Amiodarone: 3mg/kg slow IV

Lignocaine: 1mg/kg IV

## **ACIDOSIS MANAGEMENT**

Dantrolene (treats primary cause)

Hyperventilation

Consider 0.5-1 mmol/kg sodium bicarbonate if pH <7.2 (8.4% is 1mmol/ml)

## **RENAL PROTECTION**

Maintain urine output > 2ml/kg/hr by

Maintaining intravascular volume – normal saline

Mannitol – there is 3 g mannitol/vial of dantrolene

## **INOTROPIC SUPPORT**

Epinephrine/norepinephrine infusions prn

# ANAESTHESIA ASSISTANT

ONCE THE MH BOX AND REFRIGERATED SUPPLIES  
ARE IN THE OPERATING THEATRE

Lay contents out on trolley

Prepare arterial line equipment and assist anaesthetist  
to insert arterial line

Assist with dantrolene mixing

Ensure adequate stocks of resuscitation drugs are  
maintained

Assist with TIVA management

Set up central venous line equipment and assist  
anaesthetist to insert central line

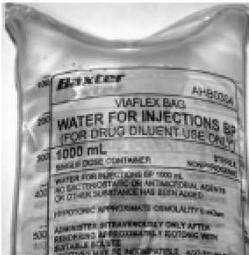
Ensure volatile agent has been removed from the  
operating room

Change soda lime when required

# DANTROLENE RECONSTITUTION

**THIS IS THE HIGHEST PRIORITY**  
**MIXING DANTROLENE CAN BE TIME CONSUMING**  
**USE AS MANY PEOPLE AS ARE AVAILABLE**  
**REPEAT DOSE EVERY 10-15 MINUTES UNTIL SYMPTOMS RESOLVE**

HERE IS ONE METHOD



1) Dantrolene must be mixed **ONLY** with **STERILE WATER**



2) 60 mls water for each 20mg vial from bag or bottle



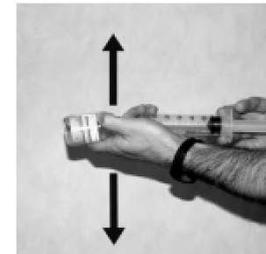
3) Remove metal vial cap or flip off cap



4) Inject 30ml of water



5) Hold syringe vertically, allow air in vial to escape, inject remaining 30mls water



6) Hold together firmly or disconnect and shake to mix

WEIGHT	10KG	20KG	30KG	40KG	50KG	60KG	70KG	80KG	90KG	100KG
AMPOULES FOR INITIAL DOSE	2	3	4	5	7	8	9	10	12	13

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# RYANODEX®

Ryanodex® is dantrolene presented as sterile 250 mg lyophilised powder. Mix Ryanodex® with 5 ml of sterile water for injection to obtain a solution with a concentration of 50 mg/ml.

The following table outlines the differences in preparations of dantrolene in the event that RYANODEX® is the preparation that is available.

Product characteristic	RYANODEX®	DANTRIUM®
Presentation	Sterile <b>250 mg</b> lyophilised powder, 20 mL vial injectable suspension for IV use	Sterile <b>20 mg</b> lyophilised powder, 65 ml vial for IV use
Formulation	Active: <b>250 mg</b> dantrolene sodium; Inactive: 125 mg mannitol, 25 mg polysorbate 80, 4 mg povidone K12, NaOH, HCl.	Active: <b>20 mg</b> dantrolene sodium; Inactive 3 g mannitol, NaOH
Dosing	Dose 2.5 mg/kg – MHANZ, MHAUS* recommendation	Dose 2.5 mg/kg – MHANZ, MHAUS* recommendation
Reconstitution/ Administration	Mix with <b>5 mL</b> WFI**; produces orange coloured suspension. For Intravenous push. Final concentration = 50 mg/mL, pH 10.3.	Mix with 60 mL WFI. Shake until solution is clear. Continuous rapid Intravenous push. Final concentration ~ 0.33 mg/mL, pH 9.5.
Warning/ Precautions/ Contraindications	Similar. Check full Product Information before prescribing.	Similar. Check full Product Information before prescribing
Storage/ Handling	Use within 6 hrs @ 20C – 25C, Protect from light	Protect from light, use within 6 hrs @ 15C – 25C

\*MHAUS – Malignant Hyperthermia Association of the United States

\*\* WFI – water for injection

WEIGHT	10KG	20KG	30KG	40KG	50KG	60KG	70KG	80KG	90KG	100KG
AMPOULES FOR INITIAL DOSE	1	1	1	1	1	1	1	1	1	1

# ANAESTHETIST 2: LINES/INVESTIGATIONS

## ENSURE TEMPERATURE PROBE INSERTED

### INSERT ARTERIAL LINE

Check arterial blood gases frequently  
Notify coordinating anaesthetist of changes

Pay particular attention to:

**Acidosis**

**Hyperkalaemia**

**PaCO<sub>2</sub>**

**Blood glucose**

## INSERT CENTRAL VENOUS LINE WHEN/IF APPROPRIATE

### SEND LABORATORY BLOODS

Urea and electrolytes

Creatinine Kinase

Coagulation screen

### URINE

Once urinary catheter is inserted, send urine sample for myoglobin

Maintain urine output at > 2ml/kg/hr

### ANAESTHETIC RECORD

Ensure an accurate anaesthetic record is being kept

Document times, temperatures, drugs and monitor recordings

Document blood test results

Document presence of masseter spasm and/or rigidity, colour of urine, excessive bleeding, time to administer dantrolene etc.

# COOLING

## AMBIENT TEMPERATURE

Reduce operating theatre thermostat to lowest setting

## IV FLUIDS

Collect 2 litres of Normal Saline (for intravenous infusion) and actrapid insulin from refrigerator located:

## ICE

Bring bags of ice from the ice machine located:

Assist packing all exposed body parts with ice bags

## DEFIBRILLATOR

Collect defibrillator located

# LOGISTICS

## **CALL FOR ADDITIONAL SUPPORT**

Ideally two specialist anaesthetists should be involved

Call senior surgeon If required to complete surgery rapidly

## **MOBILISE OFF-SITE DANTROLENE**

At least 24 ampoules should be kept on site for immediate management

Further dantrolene stocks are held at:

Hospital 1 stocks \_\_\_\_ vials

Hospital name and contact details

Hospital 2 stocks \_\_\_\_ vials

Hospital name and contact details

Organise urgent transfer of additional stocks of dantrolene

Consider air transport, ambulance and police escort to expedite delivery

## **LIAISE WITH INTENSIVE CARE FOR PATIENT TRANSFER**

All patients should be monitored post operatively in an intensive care

environment. Ongoing use of dantrolene will require assisted ventilation as dantrolene is a muscle relaxant

Up to 25% of patients relapse in the first 24 hours

## **ASSIST WITH DANTROLENE MIXING**

# **SURGICAL TEAM**

## **SURGERY**

Complete or abandon surgery as soon as possible  
Call for senior help if required to complete surgery more quickly

## **HELP COOL PATIENT**

Expose all parts of the patient outside immediate sterile field  
If abdomen open, consider washout with normal saline at 4°C  
Assist with packing all exposed body parts with ice bags

## **URINARY CATHETER**

Set up and insert urinary catheter at earliest convenience

## **ASSIST WITH DANTROLENE MIXING**

# MH CRISIS INITIAL MANAGEMENT

In most cases the most senior anaesthetist present should coordinate crisis management and we recommend the use of the task cards if the situation is appropriate

1. Declare Emergency (complete or abandon surgery)
2. Call for HELP
3. Send for the MH box and refrigerated supplies
4. Turn off volatile agent and remove vaporisers from the anaesthetic workstation (substituting IV anaesthesia maintenance if required)
5. Hyperventilate with 100% oxygen and high fresh gas flows (>15 litres/minute)
6. Do not waste time changing the anaesthesia machine or circuit
7. Distribute the task cards: the MH box contains individual task cards to help manage an MH crisis. Give each available staff member a card (or two) and ask them to complete the instructions.
8. There are multiple high priority tasks but:

**Dantrolene  
administration is  
the priority**