



QUINTE HEALTHCARE CORPORATION

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Surgical – Malignant Hyperthermia (MH) Patient Management

Title: Surgical – Malignant Hyperthermia (MH) Patient Management		Policy No:	3.23.9
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Department:	Surgical	Policy Lead:	Chief of Anaesthesia
Approved By:	Surgical Program Advisory Committee Medical Advisory Committee		

1. POLICY

This policy guides Quinte Healthcare (QHC) employees in the care and treatment of patients experiencing an acute malignant hyperthermia (MH) crisis or MH susceptible patients undergoing surgery. For additional information refer to the QHC Malignant Hyperthermia Resource Guide.

1. DEFINITIONS

Malignant Hyperthermia (MH): a potentially lethal, inherited hypermetabolic disorder of skeletal muscle. It involves an altered mechanism of calcium function at the cellular level. MH is triggered in susceptible patients when an inhaled anaesthetic agent (e.g., desflurane, enflurane, halothane, isoflurane, sevoflurane) and/or a depolarizing muscle relaxant (e.g. succinylcholine) are administered.

MH Susceptible Patient: Patients at increased risk of MH: patients with confirmed MH or with a family history of MH.

2. PROCEDURE

Treatment of Acute Malignant Hyperthermia Crisis

The diagnosis of an acute MH episode is a clinical decision based on the presence of several clinical indicators at the same time: muscle rigidity, fever, hypercarbia, metabolic and

respiratory acidosis, cardiac arrhythmias. MH is associated with a significant risk of mortality even with treatment.

Consideration of other disorders must take place at the same time as treatment for MH. Treatment can begin before diagnosis is completed. Treatment is directed at: (1) stopping and reversing the MH episode, (2) monitoring and treating the effects of the MH episode, and (3) preventing complications from the episode or its treatment. Treatment of an acute MH crisis requires involvement of the entire interprofessional team and is directed by the anesthesiologist. Refer to *Appendix A – Malignant Hyperthermia Crisis Response*

Management of MH for Susceptible Patients Undergoing Surgery

For those patients who are considered to be at increased risk of MH and undergoing scheduled surgery at QHC, the preventative measures for MH susceptible patients must be followed. Patients will be booked as first procedure of the day when possible.

Patients with MH susceptibility who require anaesthetic care must receive an adequate anaesthetic that does not include drugs that can trigger MH. Treatment is directed at preventing exposure to MH-triggering drugs, the detection of an acute MH crisis, and prevention of complications from this treatment.

In most MH susceptible patients, the following measures will be successful in preventing an acute MH crisis. If the measures in this policy are unsuccessful, the team will revert to the process outlined in the *Treatment of Acute Malignant Hyperthermia Crisis* section.

1. Preparation of Anaesthesia Machine for MH Precautions

Patients who are susceptible to MH must not receive succinylcholine or potent inhalational anaesthetic drugs. The Respiratory Therapist, Nurse or Anaesthetist on duty will prepare a standard anaesthesia machine for MH precautions by using a new, disposable breathing circuit; and replacing the carbon dioxide absorbent and flushing the machine with 100% oxygen for a minimum of 35 minutes with a 15L flow.

In the event whereby a 35-minute flush with 100% oxygen at 15L per minute is not possible due to the acuity of patient, attach one inspiratory and one expiratory charcoal filter to the anesthesia machine and connect new breathing circuit hoses to immediately deliver a vapor-free anaesthetic.

An anaesthesia machine that has already been prepared as vapour-free can be used for consecutive cases requiring MH precautions by exchanging soiled airway components with clean vapour-free airway components. A new flush procedure is not required between patients if the vapour-free technique had been provided for the preceding case. MH Safe signs will be posted on the doors of these ORs. Routine practices for infection prevention and control must be observed (refer to Policy: 3-50 – Routine Practices and Additional Precautions).

2. Post Anaesthetic Care Unit (PACU) Monitoring for MH Susceptible Patients

The patient susceptible to MH undergoing outpatient surgery may be discharged on the day of surgery if the anesthetic has been uneventful. Patients shall have vital signs monitored at least every 15 minutes for a minimum period of 1 hour in PACU, and every 30 minutes for an additional 1 hour in phase 2 PACU. End-Tidal CO₂ (ETCO₂) monitoring is not required for patients in PACU. Patients may be discharged home after 2 hours of post-operative monitoring if all other discharge criteria have been met (refer to Medical Directive 08-01 – Discharge Criteria from the PACU). Patients will receive a patient discharge instruction sheet and verbal instructions about signs and symptoms of a MH reaction.

3. Inpatient Unit Monitoring for MH Susceptible Patients

Patients should be monitored according to the Standards of Care and other patient specific assessments. Enhanced monitoring is not required for MH susceptible patients (Policy 3.16.7 – Nursing – Service Standards of Care).

4. Management of the MH Susceptible Labouring Patient

In addition to any other patient specific clinical indications, MH susceptible parturient women will have temperature, heart rate and blood pressure monitored throughout labour as per QHC Standards of Care.

Malignant Hyperthermia Tote

An MH tote is required to facilitate the treatment of an acute MH crisis. Totes contain supplement equipment and drugs that are necessary in combination with drugs available in the anaesthesia drug cart and the cardiac arrest cart. One MH tote will be stored in a designated, centrally accessible place in the Operating Room (OR)/PACU at each site.

An MH tote must be capable of being rapidly transported to any area in the hospital where anaesthetics are administered or where patients are cared for after an anaesthetic. The tote must have sufficient storage space for the contents listed below and labeled as follows, where appropriate:

Contents of MH Tote

Item(s)	Quantity	Comment
Dantrolene	36 vials	Dantrium®/Revonto®, which provides 20 mg Dantrolene sodium/60 mL after reconstitution in sterile water
Sterile Water for Injection USP (without a bacteriostatic agent)	44 vials (50ml Sterile Water)	60ml required to dilute each 20mg vial of Dantrolene
Syringes	60 mL x 5	To dilute Dantrolene

Charcoal Filters	2 pairs of activated charcoal filters	Use to absorb vapor in the anesthetic circuit
Intravenous catheters	4 each x 16G, 18G, 20G, 2-inch; 22G, 1-inch; 24G, 3/4-inch	For IV access and arterial line
Syringes	2 x 3ml, or ABG kits x 6	For blood gas analysis or Point of Care monitors
Blood Specimen Tubes and	1x lithium heparin green tube, lavender tube, SST tube, blue tube	Lab work
Urine Collection Container	1	

Labels:

Malignant Hyperthermia Tote
Return to BGH Operating Room
Extension 2448

Malignant Hyperthermia Tote
Return to PECMH Endoscopy Unit
Extension 4242

Malignant Hyperthermia Tote
Return to Quinte 7 Operating Room
Extension 2347

Malignant Hyperthermia Cart
Return to TMH Operating Room
Extension 5591

APPENDICES AND REFERENCES

Appendices: Appendix A – Malignant Hyperthermia Anaesthetic Machine Protocol
Appendix B – Malignant Hyperthermia Crisis Response

References:

- American Operating Room Nurses. (2008). AORN malignant hyperthermia guideline. 2008 standards, recommended practices, and guidelines. Accessed from: <http://www.aorn.org/about/positions/pdf/7a-mahguides.pdf>
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- Malignant Hyperthermia Association of the United States. (2016). *Post-operative procedure*. Retrieved from: <http://www.mhaus.org/healthcare-professionals/be-prepared/postoperative-procedure>
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[http://www.thefreelibrary.com/Malignant hyperthermia and day stay surgery.-a0188739645](http://www.thefreelibrary.com/Malignant+hyperthermia+and+day+stay+surgery.-a0188739645)

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University of Toronto Anesthesia and University Health Network Perioperative Interactive Education. (2015). *Elective management of MH susceptible patients*. Retrieved from http://pie.med.utoronto.ca/MH/MH_content/elective.html#q8

U.S. National Library of Medicine. (2019). *Malignant hyperthermia*. Retrieved from <https://ghr.nlm.nih.gov/condition/malignant-hyperthermia>

Cross References:

Quality, Patient Safety and Interprofessional Practice. (2016). *Malignant hyperthermia resource guide*. Belleville, ON: QHC.

Policy: 3-50 – Routine Practices and Additional Precautions

Policy 3.16.7 – Nursing – Service Standards of Care

Medical Directive 08-01 – Discharge Criteria from the PACU