

The North American Malignant Hyperthermia Registry

Report of Anesthesia in a Previously

KNOWN (or suspected)
MALIGNANT HYPERTHERMIA SUSCEPTIBLE
PATIENT

(“MHS Report”)

INSTRUCTIONS:

This form is to be filled out by an anesthesiologist or other health care provider.

1. Complete this form each time you anesthetize a patient who has been **previously diagnosed** (or suspected) as malignant hyperthermia (MH) susceptible. (Use the MHN form if a MH muscle biopsy was negative.) This form may also be used to register a nonanesthetic related event such as heat or exercise related cardiovascular collapse or rhabdomyolysis in a patient who has been **previously diagnosed** (or suspected) as malignant hyperthermia (MH) susceptible.
2. Please fill out as soon as patient is stable, preferably within 48 hours of the event.
3. The attending anesthesiologist, or other physician, should review the completed form.
4. If the patient has been registered previously in the NAMH Registry, please ask the patient for his/her Registry identification number and record it in the space provided.
5. A copy of this report may be given to the patient.

Return the original completed form to:

The North American Malignant Hyperthermia Registry
University of Florida
Department of Anesthesiology
1600 SW Archer Road, PO Box 100254
Gainesville, FL 32610

MHS REPORT

Version 8.6 May 2014

PATIENT IDENTIFICATION

1. Any previous North American MH Registry numbers associated with the patient. That is, the Registry number of this patient on a Biopsy Report, AMRA, or RSR (formerly AKA) or the Registry number's of a close relative's reports, etc.

- a. _____ Comment _____
- b. _____ Comment _____
- c. _____ Comment _____

2. Patient's Initials

first middle last

3. Has consent been obtained to enter patient's name into the Registry?

check one

- yes
- no

If yes, please complete a-g on following page.

Note: DO NOT COMPLETE IF CONSENT HAS NOT BEEN OBTAINED

a. Patient's name

last first middle

b. Patient's previous name

last first middle

c. Patient's maiden name

last

d. Patient's Address

street address

city state/province zip/postal code

country

e. Phone number

(Home) (____) ____ - ____

(Work) (____) ____ - ____

f. Patient e-mail address _____

g. Date of patient's birth

____ \ ____ \ ____

year month day

DEMOGRAPHIC INFORMATION

4. Sex

check one

() male () female

5. Weight

____ . ____ kilograms OR ____ lbs

6. Height

____ . ____ cms OR ____ ft ____ inches

7. Year of patient's birth

8. Race:

check as many as apply
(data utilized for demographic purposes only)

- | | |
|--|---|
| <input type="checkbox"/> Caucasian | <input type="checkbox"/> African |
| <input type="checkbox"/> Hispanic | <input type="checkbox"/> East Asian |
| <input type="checkbox"/> African-American | <input type="checkbox"/> South Asian |
| <input type="checkbox"/> Native American | <input type="checkbox"/> Middle Eastern |
| <input type="checkbox"/> Hawaiian or Pacific Islander | |
| <input type="checkbox"/> other (<i>specify</i>): _____ | |

9. Body Build

check one

- | | |
|--|--------------------------------|
| <input type="checkbox"/> Normal | <input type="checkbox"/> Lean |
| <input type="checkbox"/> Muscular | <input type="checkbox"/> Obese |
| <input type="checkbox"/> Postpartum | |
| <input type="checkbox"/> Other (<i>specify</i>): _____ | |

10. State or province of the patient's residence

11. State or province of the location in which anesthesia was given or the non-anesthetic event occurred.

12. Reporting physician's name (*optional*)

13. Facility type:

- Hospital
- Ambulatory Surgical facility located on hospital campus
- Free-standing ambulatory surgical facility
- Dental Office
- Surgical Office

13a. Facility name (*optional*)

14. Anesthesia Department telephone number and/or email address (*optional*)

(____) - ____ - ____ @ _____

ANESTHETIC HISTORY

15. Patient's anesthetic history is positive for:
check all applicable
 clear-cut clinical MH episode(s)
 possible MH (not clear-cut MH)
 masseter muscle rigidity only
 positive caffeine halothane contracture test
 positive genetic findings (specify) _____
 positive calcium uptake test (performed in Boston)
 other (*specify*) _____
 none of the above
 unknown
16. How many times was this patient anesthetized prior to this evaluation? __ __
 unknown but > 0 unknown
17. How many were general anesthetics?
__ __ unknown but > 0 unknown
18. Indicate the number of anesthetics with the following agents:
__ __ volatile agents without succinylcholine
__ __ volatile agents with succinylcholine
__ __ succinylcholine without other known triggering agents
 unknown

FAMILY HISTORY

19. Family history is positive for:

check all applicable

- malignant hyperthermia
 - confirmed by CHCT
 - confirmed by genetic test (specify result)_____
- masseter spasm
- intraoperative death not thought to be MH
- sudden infant death syndrome or cot death
- sudden death from unknown cause at < 45 year >1.5 years
- heatstroke
- neurolept malignant syndrome
- intolerance to heat
- chronic muscle pain
- frequent muscle cramps
- chronic muscle weakness
- exercise intolerance due to muscle pain, weakness or fever
- episodes of dark urine and muscle pain
- myopathies
 - specify type; write unknown if not known:*_____
- idiopathic creatine kinase elevation
- diabetes
 - Type 1
 - Type 2
- none of the above
- unknown

MEDICAL HISTORY

20. Has the patient had any of the following?

check all applicable

- muscle weakness interferes with daily activity at least once/week
- muscle cramps interfere with daily activity at least once/week
- cola colored urine
- heat stroke or heat prostration
- oral (or rectal/axillary equivalent) fever>38.6°C or 101.4°F at least 6 times/year without medical cause
- recent generalized infection
 - If there was infection, how long ago was it? ___ (days)
- recent use of cholesterol lowering drugs
 - If so, which drug _____, and when was it last ingested? ___ (days)
- a regular regimen of physical activity?
 - If so, when was the last work-out? ___ (days)
- ingestion of any medicine to improve muscular performance
- intolerance to heat

- exercise intolerance due to muscle pain, weakness or fever
- diabetes
 - Type 1
 - Type 2
- none of the above
- unknown

21. Has patient ever had physical findings of:

check all applicable

- increased muscle tone
- decreased muscle tone
- generalized muscle weakness
- myopathy *specify type; write unknown if not known:* _____
- ptosis
- strabismus
- hiatal hernia
- inguinal hernia
- umbilical hernia
- undescended testes
- clubbed foot
- joint hypermobility
- kyphoscoliosis (moderate or severe; curve >45°)
- pectus carinatum
- winged scapulae
- skeletal fractures (more than 2)
- gallstones
- kidney stones
- laryngeal papillomas
- other (*specify*): _____
- none of the above
- unknown

MANAGEMENT for this event.

22. Year of event ___ ___ ___

23. If this event is an anesthetic, continue *If not skip to 40*

Type of procedure scheduled

check all applicable

- cardiothoracic
- dental
- ear, nose, or throat
- eye
- general surgery

- laparoscopic surgery
 - abdominal
 - pelvic
 - other (specify) _____
- gynecology
- neurosurgery
- thoracoscopic surgery (thoracic)
- obstetrics
- oral surgery
- orthopedic
- plastic surgery
- radiology
- urology
- vascular
- transplant
- other (specify): _____

24. Was the procedure an emergency?

check one

- no yes

25. Anesthetic preparation included:

check all applicable

- dedicated vapor-free anesthesia machine
- anesthesia workstation flushed with either oxygen or air
- activated charcoal filter on the inspiratory limb
- autoclaving ventilator diaphragm and integrated breathing system
- free-standing ventilator NOT part of anesthesia workstation
- anesthetic vaporizers bypassed
- anesthetic vaporizers drained
- new carbon dioxide absorbent
- new anesthesia circuit
- new mask
- new endotracheal tube
- other (specify): _____
- unknown

26a. How many minutes was the anesthesia machine flushed?

Do not complete if not applicable

___ ___ minutes

26b. What flow rate was the anesthesia machine flushed at:

Do not complete if not applicable

_____ L/minute

- 26c. What type of anesthesia workstation was used?
_____ Type _____ Model
27. Was a premedication other than dantrolene (Dantrium) given?
check one
 no
 yes
28. Was dantrolene given before anesthetic induction?
check one
 no
 yes
If no, skip to question 31
29. Pre-induction dantrolene administration:
_____.____ dose (mg)
_____ Number of doses
____:____ Time final dose begun (military time)
____:____ Time final dose completed (military time)
30. Route of initial dantrolene administration:
check all applicable
 iv
 po
31. Were any complications from dantrolene administration noted?
check one
 no
 yes
If no, skip to question 31
32. What dantrolene associated complications were observed?
check all applicable
 phlebitis
 excessive secretions
 gastrointestinal upset
 hyperkalemia
 muscle weakness
 respiratory failure
 other (*specify*): _____

33. Monitoring utilized:

check all monitoring used

- | | |
|--|---|
| <input type="checkbox"/> blood pressure monitor | <input type="checkbox"/> end-tidal PCO ₂ |
| <input type="checkbox"/> electrocardiograph | <input type="checkbox"/> pulse oximeter |
| <input type="checkbox"/> stethoscope | <input type="checkbox"/> bladder (Foley) catheter |
| <input type="checkbox"/> arterial catheter | |
| <input type="checkbox"/> central venous catheter | |
| <input type="checkbox"/> pulmonary artery catheter | |

temperature probes:

- axillary
- bladder
- esophageal
- nasopharyngeal
- rectal
- skin-electronic
- skin-liquid crystal
- tympanic
- other (*specify*): _____

34. Were local anesthetic agents used?

check one

- no
- yes

35. Route of local anesthetic administration:

check all applicable

- epidural
- intercostals
- intravenous
- major plexus block
- spinal
- subcutaneous
- topical or mucosal
- other (*specify*): _____

36. Local anesthetic drugs and vasoconstrictors utilized:

check all applicable

- benzocaine (Americaine)
- bupivacaine (Marcaine)
- levo-bupivacaine
- chloroprocaine (Nesacaine)

- cocaine
- etidocaine (Duranest)
- lidocaine (Xylocaine)
- mepivacaine (Carbocaine)
- prilocaine (Citanest)
- procaine (Novocain)
- ropivacaine (Naropin)
- tetracaine (Pontocaine)
- ephedrine
- epinephrine
- neosynephrine

37. Other anesthetic agents utilized (including premedication):

check all applicable

- | | |
|---|---|
| <input type="checkbox"/> atropine | <input type="checkbox"/> <i>no potent volatile anesthetic</i> |
| <input type="checkbox"/> glycopyrrolate (Robinul) | |
| <input type="checkbox"/> scopolamine (Hyoscine) | <input type="checkbox"/> fentanyl and droperidol (Innovar) |
| <input type="checkbox"/> droperidol (Inapsine) | <input type="checkbox"/> meperidine (Demerol) |
| <input type="checkbox"/> hydroxyzine (Vistaril) | <input type="checkbox"/> morphine |
| <input type="checkbox"/> promethazine (Phenergan) | <input type="checkbox"/> opium (Pantopon) |
| <input type="checkbox"/> diphenhydramine (Benedryl) | <input type="checkbox"/> sufentanil (Sufenta) |
| | <input type="checkbox"/> hydromorphone (Dilaudid) |
| <input type="checkbox"/> ketorolac (Toradol) | |
| <input type="checkbox"/> acetaminophen (Tylenol) | <input type="checkbox"/> nalbuphine (Nubain) |
| | <input type="checkbox"/> naloxone (Narcan) |
| <input type="checkbox"/> diazepam (Valium) | |
| <input type="checkbox"/> lorazepam (Ativan) | <input type="checkbox"/> atracurium (Tracrium) |
| <input type="checkbox"/> midazolam (Versed) | <input type="checkbox"/> gallamine |
| <input type="checkbox"/> nitrous oxide | <input type="checkbox"/> pancuronium (Pavulon) |
| | <input type="checkbox"/> rocuronium (Zemuron) |
| <input type="checkbox"/> etomidate (Amidate) | <input type="checkbox"/> vecuronium (Norcuron) |
| <input type="checkbox"/> ketamine (Ketalar) | <input type="checkbox"/> <i>NO succinylcholine</i> |
| <input type="checkbox"/> propofol (Diprivan) | |
| <input type="checkbox"/> alfentanil (Alfenta) | <input type="checkbox"/> edrophonium (Tensilon) |
| <input type="checkbox"/> fentanyl (Sublimaze) | <input type="checkbox"/> neostigmine (Prostigmin) |
| | <input type="checkbox"/> physostigmine (Antilirium) |
- other (*specify*): _____

38. Type of anesthetic
check all applicable
- monitored anesthesia care
 - regional anesthesia
 - spinal anesthesia
 - epidural anesthesia
 - general anesthesia **without** laryngeal mask airway or endotracheal intubation
 - general anesthesia **with** a laryngeal mask airway
 - general anesthesia **with** endotracheal intubation
39. Type of ventilation
check one
- spontaneous
 - assisted
 - controlled
40. Time of anesthetic induction for general/regional anesthetic?
__ __. __ __ (*hours and minutes since induction*)
41. Earliest time the patient was stable in recovery room or intensive care unit? (*after induction*)
__ __. __ __ (*hours and minutes since induction*)

MH COMPLICATIONS

42. Were any signs of MH noted?
check one
- no yes
- If no, skip to comments*

43. Abnormal signs noted (signs felt to be inappropriate in the judgment of the attending anesthesiologist or other physician)

NUMBER in order of appearance

(a number may be used more than once if signs noted simultaneously)

- masseter spasm
 generalized muscular rigidity
 cola colored urine
 tachypnea
 hypercarbia
 cyanosis
 sinus tachycardia
 ventricular tachycardia
 ventricular fibrillation
 elevated temperature
 rapidly increasing temperature
 sweating
 excessive bleeding
 hypertension > 20% of baseline
 other (*specify*): _____

44. Signs

fill in the blanks

- ____ . ____ time first adverse sign noted (***after induction***)
 (*hours and minutes since induction*)
 ____ . ____ time second adverse sign noted (***after induction***)
 (*hours and minutes since induction*)
 ____ . ____ maximum temperature noted (°C) **OR**
 ____ . ____ maximum temperature noted (°F)
 ____ . ____ time maximum temperature noted (***after induction***)
 (*hours and minutes since induction*)
 ____ ____ maximum end-tidal pCO₂ noted (mmHg)
 ____ . ____ time maximum end-tidal CO₂ noted (***after induction***)
 (*hours and minutes since induction*)

45. Laboratory Evaluation

fill in the blank, write unknown if results not known

most abnormal arterial blood gas after MH was suspected

__ . __ __ FiO₂

__ . __ __ pH

__ __ __ PCO₂ (mmHg) __ __ __ liters/minute

__ __ __ PO₂ (mmHg) ventilation at time

__ . __ . __ BE (mEq/L) (*specify ±*) blood gas was obtained

__ __ Bicarbonate (mEq/L)

__ . __ . __ Time (*after induction*)
(*hours and minutes since induction*)

peak lactic acid

__ . __ mmol/L

peak K⁺

__ . __ . __ mEq/L or mmol/L

peak post-op creatine kinase*

__ __ __ , __ __ __ U/L

__ __ hours after induction

***recommended intervals for creatine
kinase determination are 0, 6, 12, 24
hours after MH reaction suspected**

peak serum myoglobin

__ __ , __ __ __ ng/ml

__ __ hours after induction

peak urine myoglobin

__ __ , __ __ __ mg/L

__ __ hours after induction

PT (prothrombin time)	INR	PTT (partial thromboplastin time)
__ __ seconds	__.	__ __ seconds
laboratory upper limit of normal		laboratory upper limit of normal
__ __ __ seconds		__ __ __ seconds
platelet count		fibrinogen
__ __ __, __ __ __		__ __ __ __ mg/dl

46. Treatment given for signs of MH
check all treatments utilized; fill in the blanks

- Hyperventilation with 100% oxygen
- Intraoperative or postoperative dantrolene given
 __ __. __ Time required (*after induction*)
 (hours and minutes since induction)
 __ __ __ __ Total dose given after induction (mg)
- Active cooling
 Method (specify) _____
- Fluid loading
 __ __ ml/kg
 Fluid type (specify) _____
- Furosemide
- Mannitol
- Bicarbonate
- Glucose, insulin
- Bretylium
- Lidocaine
- Procainamide
- Defibrillation
- CPR
- Other (*specify*): _____

47. Did the patient survive the initial MH reaction?
check one

- no
- yes *If no, please skip to question 51*

48. Did the patient develop additional signs or symptoms after initial adequate treatment (recrudesce)? *check one*

no

yes

If no, please skip to comments

49. When did the patient recrudesce?

__ __ hours after induction

50. Did the patient survive the recrudescence?

check one

no

yes

51. If the patient died, what was the cause of death?

check one

MH

other (*specify*): _____

COMMENTS ON PATIENT

Optional
