

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 non-anesthetic 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
UPMC Mercy Hospital
8th Floor, Ermire Building (B)
Room 8522-3
1400 Locust Street
Pittsburgh, PA 15219
1-888-274-7899

North American MH Registry Number (*for office use*)

MHS REPORT
Version 8.4 June 2010

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 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)
 Caucasian African
 Hispanic East Asian
 African-American South Asian
 Native American Middle Eastern
 Hawaiian or Pacific Islander
 other (*specify*): _____
9. Body Build
check one
 Normal Lean
 Muscular Obese
 Postpartum
 Other (*specify*): _____
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"/> fentanyl and droperidol (Innovar) |
| <input type="checkbox"/> glycopyrrolate (Robinul) | <input type="checkbox"/> meperidine (Demerol) |
| <input type="checkbox"/> scopolamine (Hyoscine) | <input type="checkbox"/> morphine |
| | <input type="checkbox"/> opium (Pantopon) |
| <input type="checkbox"/> droperidol (Inapsine) | <input type="checkbox"/> sufentanil (Sufenta) |
| <input type="checkbox"/> hydroxyzine (Vistaril) | |
| <input type="checkbox"/> promethazine (Phenergan) | <input type="checkbox"/> nalbuphine (Nubain) |
| | <input type="checkbox"/> naloxone (Narcan) |
| <input type="checkbox"/> methohexital (Brevital) | |
| <input type="checkbox"/> pentobarbital (Nembutal) | <input type="checkbox"/> atracurium (Tracrium) |
| <input type="checkbox"/> thiamylal | <input type="checkbox"/> curare |
| <input type="checkbox"/> thiopental (Pentothal) | <input type="checkbox"/> gallamine |
| | <input type="checkbox"/> metocurine (Metubine) |
| <input type="checkbox"/> diazepam (Valium) | <input type="checkbox"/> mivacurium (Mivacron) |
| <input type="checkbox"/> lorazepam (Ativan) | <input type="checkbox"/> pancuronium (Pavulon) |
| <input type="checkbox"/> midazolam (Versed) | <input type="checkbox"/> pipecuronium (Arduan) |
| <input type="checkbox"/> nitrous oxide | <input type="checkbox"/> rocuronium (Zemuron) |
| | <input type="checkbox"/> vecuronium (Norcuron) |
| <input type="checkbox"/> etomidate (Amidate) | <input type="checkbox"/> NO succinylcholine |
| <input type="checkbox"/> ketamine (Ketalar) | |
| <input type="checkbox"/> propofol (Diprivan) | <input type="checkbox"/> edrophonium (Tensilon) |
| <input type="checkbox"/> alfentanil (Alfenta) | <input type="checkbox"/> neostigmine (Prostigmin) |
| <input type="checkbox"/> fentanyl (Sublimaze) | <input type="checkbox"/> physostigmine (Antilirium) |
| | <input type="checkbox"/> pyridostigmine (Mestinon) |

no potent volatile anesthetic

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?
— . — . — (in hours, express parts of an hour using decimal points)
(example – 3 minutes = 0.05)
41. Earliest time the patient was stable in recovery room or intensive care unit? (**after induction**)
— . — . — (in hours, express parts of an hour using decimal points)
(example – 3 minutes = 0.05)

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***)
(in hours, express parts of an hour using decimal points)
(example – 3 minutes = 0.05)
- ___ . ___ time second adverse sign noted (***after induction***)
(in hours, express parts of an hour using decimal points)
(example – 3 minutes = 0.05)
- ___ . ___ maximum temperature noted (° C) **OR**
- ___ . ___ maximum temperature noted (° F)
- ___ . ___ time maximum temperature noted (***after induction***)
(in hours, express parts of an hour using decimal points)
(example – 3 minutes = 0.05)
- ___ ___ maximum end-tidal pCO₂ noted (mmHg)
- ___ . ___ time maximum end-tidal CO₂ noted (***after induction***)
(in hours, express parts of an hour using decimal points)
(example – 3 minutes = 0.05)

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*)
 (*in hours, express parts of an hour using decimal points*)
 (*example – 3 minutes = 0.05*)

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)

__ __ seconds

INR

__ . __

PTT (partial thromboplastin time)

__ __ seconds

laboratory upper limit of normal

__ __ __ seconds

laboratory upper limit of normal

__ __ __ 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*)
 (*in hours, express parts of an hour using decimal points*)
 (*example – 3 minutes = 0.05*)
 - ___ ___ ___ 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
