The North American Malignant Hyperthermia Registry

Report of Anesthesia in a Previously KNOWN (or suspected) MALIGNANT HYPERTERMIA 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
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
   ( ) 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

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): _______________________________________

If not skip to 40

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
   ( ) blood pressure monitor  ( ) end-tidal PCO₂
   ( ) electrocardiograph       ( ) pulse oximeter
   ( ) stethoscope             ( ) bladder (Foley) catheter
   ( ) arterial catheter
   ( ) central venous catheter
   ( ) 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
   
   (   ) atropine
   (   ) glycopyrrolate (Robinul)
   (   ) scopolamine (Hyoscine)
   (   ) droperidol (Inapsine)
   (   ) hydroxyzine (Vistaril)
   (   ) promethazine (Phenergan)
   (   ) methohexital (Brevital)
   (   ) pentobarbital (Nembutal)
   (   ) thiamylal
   (   ) thiopental (Pentothal)
   (   ) diazepam (Valium)
   (   ) lorazepam (Ativan)
   (   ) midazolam (Versed)
   (   ) nitrous oxide
   (   ) etomidate (Amidate)
   (   ) ketamine (Ketalar)
   (   ) propofol (Diprivan)
   (   ) alfentanil (Alfenta)
   (   ) fentanyl (Sublimaze)
   (   ) fentanyl and droperidol (Innovar)
   (   ) meperidine (Demerol)
   (   ) morphine
   (   ) opium (Pantoopon)
   (   ) sufentanil (Sufenta)
   (   ) nalbuphine (Nubain)
   (   ) naloxone (Narcan)
   (   ) atracurium (Tracrium)
   (   ) curare
   (   ) gallamine
   (   ) metocurine (Metubine)
   (   ) mivacurium (Mivacron)
   (   ) pancuronium (Pavulon)
   (   ) pipecuronium (Arduan)
   (   ) rocuronium (Zemuron)
   (   ) vecuronium (Norcuron)
   (   ) NO succinylcholine
   (   ) edrophonium (Tensilon)
   (   ) neostigmine (Prostigmin)
   (   ) physostigmine (Antilirium)
   (   ) 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

\[ \text{---.---} \quad \text{FiO}_2 \]
\[ \text{---.---} \quad \text{pH} \]
\[ \text{---.---} \quad \text{PCO}_2 \quad \text{mmHg} \quad \text{---.---} \quad \text{liters/minute} \]
\[ \text{---.---} \quad \text{PO}_2 \quad \text{mmHg} \quad \text{ventilation at time} \]
\[ \text{---.---} \quad \text{BE (mEq/L) (specify ±)} \quad \text{blood gas was obtained} \]
\[ \text{---.---} \quad \text{Bicarbonate (mEq/L)} \]
\[ \text{---.---} \quad \text{Time (after induction)} \]
\[ \text{(in hours, express parts of an hour using decimal points)} \]
\[ \text{(example – 3 minutes = 0.05)} \]

peak lactic acid
\[ \text{---.---} \quad \text{mmol/L} \]

peak K⁺
\[ \text{---.---} \quad \text{mEq/L or mmol/L} \]

peak post-op creatine kinase*
\[ \text{---.---} \quad \text{U/L} \]
\[ \text{---.---} \quad \text{hours after induction} \]

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

peak serum myoglobin
\[ \text{---.---} \quad \text{ng/ml} \]
\[ \text{---.---} \quad \text{hours after induction} \]

peak urine myoglobin
\[ \text{---.---} \quad \text{mg/L} \]
\[ \text{---.---} \quad \text{hours after induction} \]

PT (prothrombin time)  INR  PTT (partial thromboplastin time)
\[ \text{---.---} \quad \text{seconds} \quad \text{---.---} \quad \text{seconds} \]

laboratory upper limit of normal
\[ \text{---.---} \quad \text{seconds} \quad \text{---.---} \quad \text{seconds} \]

platelet count
\[ \text{---.---} \quad \text{---.---} \quad \text{---.---} \quad \text{---.---} \]

fibrinogen
\[ \text{---.---} \quad \text{---.---} \quad \text{mg/dl} \]
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
________________________________________________
________________________________________________
________________________________________________
________________________________________________
________________________________________________