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
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)
   ( ) 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
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 PCO$_2$
   ( ) 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)
( ) diphenhydramine (Benedryl)
( ) ketorolac (Toradol)
( ) acetaminophen (Tylenol)
( ) diazepam (Valium)
( ) lorazepam (Ativan)
( ) midazolam (Versed)
( ) nitrous oxide
( ) etomidate (Amidate)
( ) ketamine (Ketalar)
( ) propofol (Diprivan)
( ) alfentanil (Alfenta)
( ) fentanyl (Sublimaze)
( ) other (specify): __________________________________________

   ( ) no potent volatile anesthetic
   ( ) fentanyl and droperidol (Innovar)
   ( ) meperidine (Demerol)
   ( ) morphine
   ( ) opium (Pantopon)
   ( ) sufentanil (Sufenta)
   ( ) hydromorphone (Dilaudid)
   ( ) nalbuphine (Nubain)
   ( ) naloxone (Narcan)
   ( ) atracurium (Tracrium)
   ( ) gallamine
   ( ) pancuronium (Pavulon)
   ( ) rocuronium (Zemuron)
   ( ) vecuronium (Norcuron)
   ( ) NO succinylcholine
   ( ) edrophonium (Tensilon)
   ( ) neostigmine (Prostigmin)
   ( ) physostigmine (Antilirium)
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

_._._., _._._._ 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  
__ __ seconds          __ __

PTT (partial thromboplastin time)
__ __ 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)

(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*

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________