

North American MH Registry Number (office use only)  
-----**ADVERSE METABOLIC REACTION TO ANESTHESIA**

Version 1.2 July 1988

**DEMOGRAPHIC INFORMATION**

1. Sex  
*check one*  
( ) a. male  
( ) b. female
2. Weight  
----- kilograms
3. Date of patient's birth  
-- -- -- / -- -- -- / -- -- --  
year month day  
(3 letters)
4. Race  
*check as many as apply*  
( ) a. caucasian  
( ) b. negro  
( ) c. hispanic  
( ) d. oriental  
( ) e. other *specify*: \_\_\_\_\_
5. Body build:  
*check one*  
( ) a. lean  
( ) b. muscular  
( ) c. obese  
( ) d. normal  
( ) e. other *specify*: \_\_\_\_\_
6. State or province of patient's residence  
-- --
7. State or province of hospital  
-- --
8. Hospital name *optional--for statistical purposes only*  
-----
9. Anesthesia department telephone number  
*optional--for statistical purposes only (to ascertain annual number of cases)*  
( -- -- ) - -- -- - -- --

## ANESTHETIC HISTORY

10. Number of times patient anesthetized prior to this evaluation?

Skip to question 14 if zero

11. How many were general anesthetics?

① 2008年12月31日

12. Year of most recent anesthetic?

year

13. Were unusual metabolic responses noted during prior anesthetics?

*check one*

( ) ( )

no      yes

## FAMILY HISTORY

14. Family history positive for:

*check all applicable*

- ( ) a. malignant hyperthermia  
( ) b. intraoperative death not thought to be MH  
( ) c. sudden infant death syndrome or cot death  
( ) d. sudden death from unknown cause at an age between 1.5 and 45 yrs  
( ) e. heat stroke  
( ) f. neurolept malignant syndrome  
( ) g. myopathies *specify type; write unknown if not known :*

- ( )h. none of the above

## PHYSICAL FINDINGS

15. Has patient ever had physical findings of:

*check all applicable*

- ( ) a. increased muscle tone  
( ) b. decreased muscle tone  
( ) c. generalized muscle weakness  
( ) d. myopathy *specify type write unknown if not known :*

- ( )e. ptosis
- ( )f. strabismus
- ( )g. hiatal hernia
- ( )h. inguinal hernia
- ( )i. umbilical hernia
- ( )j. undescended testes

- ( )k. clubbed foot
- ( )l. joint hypermobility
- ( )m. kyphoscoliosis (moderate or severe; curve  $>45^\circ$ )
- ( )n. pectus carinatum
- ( )o. winged scapulae
- ( )p. skeletal fractures (more than 2)
- ( )q. gallstones
- ( )r. kidney stones
- ( )s. laryngeal papillomas
- ( )t. other *specify*: \_\_\_\_\_
- ( )u. none of the above

### ADVERSE METABOLIC REACTION TO ANESTHESIA

16. Date of adverse metabolic reaction to anesthesia

\_\_\_\_ year \_\_\_\_ month \_\_\_\_ day  
 (3 letters)

17. Type of procedure scheduled  
*check all applicable*

- ( ) cardiothoracic  
( ) ear, nose, or throat  
( ) general surgery  
( ) neurosurgery  
( ) obstetrics or gynecology  
( ) oral surgery  
( ) orthopedic  
( ) radiologic  
( ) urology  
( ) vascular  
( ) other *specify:* \_\_\_\_\_

18. Was the procedure an emergency?

*check one*

- ( ) ( )  
no yes

19. After adverse metabolic reaction was noted, the surgical procedure was:

*check one*

- ```
( ) deferred
( ) terminated before all scheduled procedures completed
( ) completed
```

20. Premedication and anesthetic agents utilized (before reaction occurred):  
*check all applicable*

- |                                                   |                                                               |
|---------------------------------------------------|---------------------------------------------------------------|
| <input type="checkbox"/> cimetidine (Tagamet)     | <input type="checkbox"/> nalbuphine (Nubain)                  |
| <input type="checkbox"/> metoclopramide (Reglan)  | <input type="checkbox"/> naloxone (Narcan)                    |
| <input type="checkbox"/> ranitidine (Zantac)      |                                                               |
| <input type="checkbox"/> atropine                 | <input type="checkbox"/> atracurium (Tracrium)                |
| <input type="checkbox"/> glycopyrrolate (Robinul) | <input type="checkbox"/> curare                               |
| <input type="checkbox"/> scopolamine              | <input type="checkbox"/> gallamine                            |
|                                                   | <input type="checkbox"/> metocurine (Metubine)                |
| <input type="checkbox"/> droperidol (Inapsine)    | <input type="checkbox"/> pancuronium (Pavulon)                |
| <input type="checkbox"/> hydroxyzine (Vistaril)   | <input type="checkbox"/> <b>IM</b> succinylcholine (Anectine) |
| <input type="checkbox"/> promethazine (Phenergan) | <input type="checkbox"/> <b>IV</b> succinylcholine (Anectine) |
|                                                   | <input type="checkbox"/> vecuronium (Norcuron)                |
| <input type="checkbox"/> methohexital (Brevital)  | <input type="checkbox"/> edrophonium (Tensilon)               |
| <input type="checkbox"/> pentobarbital (Nembutal) | <input type="checkbox"/> neostigmine (Prostigmin)             |
| <input type="checkbox"/> thiamylal                | <input type="checkbox"/> physostigmine (Antilirium)           |
| <input type="checkbox"/> thiopental (Pentothal)   | <input type="checkbox"/> pyridostigmine (Mestinon)            |
| <input type="checkbox"/> diazepam (Valium)        | <input type="checkbox"/> bupivacaine (Marcaine)               |
| <input type="checkbox"/> midazolam (Versed)       | <input type="checkbox"/> chlorprocaine (Nesacaine)            |
|                                                   | <input type="checkbox"/> cocaine                              |
| <input type="checkbox"/> etomidate (Amidate)      | <input type="checkbox"/> etidocaine (Duranest)                |
| <input type="checkbox"/> ketamine (Ketalar)       | <input type="checkbox"/> lidocaine (Xylocaine)                |
| <input type="checkbox"/> nitrous oxide            | <input type="checkbox"/> mepivacaine (Carbocaine)             |
|                                                   | <input type="checkbox"/> prilocaine (Citanest)                |
| <input type="checkbox"/> enflurane (Ethrane)      | <input type="checkbox"/> procaine (Novocain)                  |
| <input type="checkbox"/> halothane (Fluothane)    | <input type="checkbox"/> tetracaine (Pontocaine)              |
| <input type="checkbox"/> isoflurane (Forane)      |                                                               |
| <input type="checkbox"/> alfentanil (Alfenta)     | <input type="checkbox"/> epinephrine                          |
| <input type="checkbox"/> fentanyl (Sublimaze)     | <input type="checkbox"/> neosynephrine                        |
| <input type="checkbox"/> meperidine (Demerol)     |                                                               |
| <input type="checkbox"/> morphine                 |                                                               |
| <input type="checkbox"/> sufentanil (Sufenta)     |                                                               |

☐ other *specify*: \_\_\_\_\_

21. Anesthesia induction time  
 \_\_\_\_ : \_\_\_\_ (military time)

22. Monitoring utilized (before reaction occurred):  
*check all monitoring used*

( ) blood pressure monitor  
 ( ) electrocardiograph  
 ( ) stethoscope

( ) end-tidal PCO<sub>2</sub>  
 ( ) pulse oximeter

( ) bladder (Foley) catheter

temperature probes:

( ) axillary  
 ( ) bladder  
 ( ) esophageal  
 ( ) nasopharyngeal  
 ( ) rectal  
 ( ) skin  
 ( ) tympanic

( ) arterial line  
 ( ) central venous line  
 ( ) pulmonary artery line

23. Abnormal signs noted  
*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

\_\_\_ tachycardia  
 \_\_\_ arrhythmia

\_\_\_ rapidly increasing temperature  
 \_\_\_ sweating

\_\_\_ excessive bleeding

\_\_\_ other specify: \_\_\_\_\_

24. Signs  
*fill in the blanks*

\_\_\_ : \_\_\_ time first adverse sign noted (military time)

\_\_\_ maximum temperature noted (°C)

\_\_\_ : \_\_\_ time noted (military time)

\_\_\_ maximum end-tidal pCO<sub>2</sub> noted (mmHg)

\_\_\_ : \_\_\_ time noted (military time)

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## 25. Laboratory Evaluation

*fill in the blanks for all lab tests obtained; write unknown if results not known*

first arterial blood gas after MH was suspected

|       |                         |
|-------|-------------------------|
| — — — | FiO <sub>2</sub>        |
| — . — | pH                      |
| — — — | PCO <sub>2</sub> (mmHg) |
| — — — | PO <sub>2</sub> (mmHg)  |
| — — . | BE (mEq/L) (specify ±)  |
| — — . | Bicarbonate (mEq/L)     |
| — : — | time (military time)    |

first venous blood gas after MH was suspected

|       |                         |
|-------|-------------------------|
| — . — | FiO <sub>2</sub>        |
| — . — | pH                      |
| — — — | PCO <sub>2</sub> (mmHg) |
| — — — | PO <sub>2</sub> (mmHg)  |
| — — . | BE (mEq/L) (specify ±)  |
| — — . | Bicarbonate (mEq/L)     |
| — : — | time (military time)    |

peak lactic acid

*fill in the blank next to the correct units*

— . — mmol/L

peak K<sup>+</sup>

*fill in the blank next to the correct units*

— . — mEq/L  
— . — mmol/L

initial post-op creatine kinase\*

— — — U/L  
— — hours after induction

serum myoglobin\*

— — — mg/dl  
— — hours after induction

PT (prothrombin time)

— — seconds

laboratory upper limit of normal

— — seconds

PTT (partial thromboplastin time)

— — seconds

laboratory upper limit of normal

— — seconds

\* recommended intervals for creatine kinase and serum myoglobin determination are 0,6,12,24 hours after adverse metabolic reaction

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26. Monitoring utilized (after reaction occurred):  
check all monitoring used

|                                                 |                                                     |
|-------------------------------------------------|-----------------------------------------------------|
| <input type="checkbox"/> blood pressure monitor | <input type="checkbox"/> end-tidal PCO <sub>2</sub> |
| <input type="checkbox"/> electrocardiograph     | <input type="checkbox"/> pulse oximeter             |
| <input type="checkbox"/> stethoscope            | <input type="checkbox"/> bladder (Foley) catheter   |
| <u>temperature probes:</u>                      |                                                     |
| <input type="checkbox"/> axillary               | <input type="checkbox"/> arterial line              |
| <input type="checkbox"/> bladder                | <input type="checkbox"/> central venous line        |
| <input type="checkbox"/> esophageal             | <input type="checkbox"/> pulmonary artery line      |
| <input type="checkbox"/> nasopharyngeal         |                                                     |
| <input type="checkbox"/> rectal                 |                                                     |
| <input type="checkbox"/> skin                   |                                                     |
| <input type="checkbox"/> tympanic               |                                                     |

27. Treatment given for possible or fulminant MH  
check all treatments utilized; fill in the blanks

☐ Volatile anesthetics discontinued  
    \_\_ \_\_: \_\_ \_\_ time (military time)

☐ Anesthesia machine changed

☐ Anesthesia circuit changed

☐ Hyperventilation with 100% oxygen

☐ Dantrolene (Dantrium)  
    \_\_ \_\_ \_\_ \_\_ \_\_ Initial dose (mg)  
                                    (2.5 mg/kg initial recommended dose)  
    \_\_ \_\_: \_\_ \_\_ Time of first dose (military time)  
    \_\_ \_\_ \_\_ \_\_ \_\_ Total dose (mg)

☐ Active cooling

☐ Fluid loading

☐ Furosemide

☐ Mannitol

☐ Bicarbonate

☐ Glucose, insulin

☐ Lidocaine

☐ Procainamide

☐ Defibrillation

☐ CPR

☐ Other *specify*: \_\_\_\_\_

28. Were any problems noted with the dantrolene administration?  
check one

☐ ☐  
no      yes

If no, please skip to question 30

## 29. What were the observed dantrolene complications?

*check all applicable*

- ☐ phlebitis  
☐ excessive secretions  
☐ gastrointestinal upset  
☐ hyperkalemia  
☐ muscle weakness  
☐ respiratory failure  
☐ other *specify*: \_\_\_\_\_

## 30. Anesthetic Agents Utilized After Adverse Metabolic Reaction Noted:

*check all applicable*

- |                                                   |                                                     |
|---------------------------------------------------|-----------------------------------------------------|
| <input type="checkbox"/> atropine                 | <input type="checkbox"/> nalbuphine (Nubain)        |
| <input type="checkbox"/> glycopyrrolate (Robinul) | <input type="checkbox"/> atracurium (Tracrium)      |
| <input type="checkbox"/> scopolamine              | <input type="checkbox"/> curare                     |
| <input type="checkbox"/> droperidol (Inapsine)    | <input type="checkbox"/> gallamine                  |
| <input type="checkbox"/> hydroxyzine (Vistaril)   | <input type="checkbox"/> metocurine (Metubine)      |
| <input type="checkbox"/> promethazine (Phenergan) | <input type="checkbox"/> pancuronium (Pavulon)      |
| <input type="checkbox"/> methohexital (Brevital)  | <input type="checkbox"/> vecuronium (Norcuron)      |
| <input type="checkbox"/> pentobarbital (Nembutal) | <input type="checkbox"/> edrophonium (Tensilon)     |
| <input type="checkbox"/> thiamylal                | <input type="checkbox"/> neostigmine (Prostigmin)   |
| <input type="checkbox"/> thiopental (Pentothal)   | <input type="checkbox"/> physostigmine (Art. Irium) |
| <input type="checkbox"/> diazepam (Valium)        | <input type="checkbox"/> pyridostigmine (Mestinon)  |
| <input type="checkbox"/> midazolam (Versed)       | <input type="checkbox"/> bupivacaine (Marcaine)     |
| <input type="checkbox"/> etomidate (Amidate)      | <input type="checkbox"/> chloroprocaïne (Nesacaine) |
| <input type="checkbox"/> nitrous oxide            | <input type="checkbox"/> etidocaine (Duranest)      |
| <input type="checkbox"/> alfentanil (Alfenta)     | <input type="checkbox"/> lidocaine (Xylocaine)      |
| <input type="checkbox"/> fentanyl (Sublimaze)     | <input type="checkbox"/> mepivacaine (Carbocaine)   |
| <input type="checkbox"/> meperidine (Demerol)     | <input type="checkbox"/> tetracaine (Pontocaine)    |
| <input type="checkbox"/> morphine                 |                                                     |
| <input type="checkbox"/> sufentanil (Sufenta)     |                                                     |

☐ other *specify*: \_\_\_\_\_

**PATIENT OUTCOME**

## 31. Did the patient survive the initial reaction?

*check one*

- ☐ ( )  
 no      yes

*If no, please skip to question 35*



32. Did the patient develop additional signs or symptoms after initial adequate treatment (recrudescence)?

check one

( ) ( )

no yes

If no, please skip to comments

33. What was the time of the recrudescence?

— — — time (military time)

34. Did the patient survive the recrudescence?

check one

( ) ( )

no yes

### CLINICAL IMPRESSION

35. Patient experienced (opinion of attending anesthesiologist):

check one

( ) a. adverse metabolic reaction that was not related to MH

( ) b. possible MH (MH diagnostic center referral is recommended)

( ) c. fulminant MH (MH diagnostic center referral is recommended for patient and family counseling)

36. Were the patient and his family referred to a MH diagnostic center?

check one

( ) ( )

no yes

If no, please skip to comments

37. To which MH diagnostic center was the patient referred?

check one

- ( ) Hahnemann University Hospital ..... Philadelphia, PA  
 ( ) Loyola University Medical Center ..... Chicago, IL  
 ( ) Mayo Clinic ..... Rochester, MN  
 ( ) Ottawa Civic Hospital ..... Ottawa, ON  
 ( ) Toronto General Hospital ..... Toronto, ON  
 ( ) UCLA Medical Center ..... Los Angeles, CA  
 ( ) Uniformed Services University ..... Bethesda, MD  
 ( ) University of Calgary ..... Calgary, AB  
 ( ) University of California at Davis ..... Davis, CA  
 ( ) University of Florida ..... Gainesville, FL  
 ( ) University of Iowa Hospitals and Clinics ..... Iowa City, IA  
 ( ) University of Manitoba ..... Winnipeg, MB  
 ( ) University of Massachusetts Medical Center ..... Worcester, MA  
 ( ) University of Nebraska Medical Center ..... Omaha, NE  
 ( ) University of South Florida ..... Tampa, FL  
 ( ) University of Texas Health Science Center ..... Houston, TX  
 ( ) University of Texas Medical Branch ..... Galveston, TX  
 ( ) University of Washington ..... Seattle, WA  
 ( ) University of Wisconsin Hospital & Clinics ..... Madison, WI

See last page for MH diagnostic center directory

COMMENTS ON PATIENT (optional)

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COMMENTS ON FORM (suggestions for making this form clearer)

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*Please make xerox copies and distribute according to instructions on cover sheet*  
*Mail original to:*

*The North American Malignant Hyperthermia Registry*  
*Department of Anesthesia*  
*Pennsylvania State University College of Medicine*  
*P.O. Box 850*  
*Hershey, Pennsylvania 17033 U.S.A.*

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