UNIVERSITY STANDARD

UNIVERSITY STANDARD ON MONITORING ANIMALS ON NEUROMUSCULAR BLOCKING AGENTS (NMB)

Introduction

PURPOSE
The purpose of this standard is to ensure that any proposed neuromuscular blocking drugs are properly utilized in conjunction with appropriate analgesics and anesthetics and users are aware of autonomic nervous system changes that can be indicator of pain related to an inadequate depth of anesthesia.

SCOPE OF APPLICABILITY
All research personnel engaged in use of neuromuscular blocking agents in animal experiments.

The UNC-CH IACUC expects that anyone involved in animal work at the University will comply with this Standard. Requests for exceptions to this Standard must be reviewed and approved by the IACUC.

Standard

The Guide for the Care and Use of Laboratory Animals states that “neuromuscular blocking agents may not provide analgesia but may be useful when used in combination with appropriate analgesics and anesthetics to provide balanced anesthesia and to minimize stress associated with perioperative procedures. Neuromuscular blocking agents (e.g., pancuronium) are sometimes used to paralyze skeletal muscles during surgery in which general anesthetics have been administered; because this paralysis eliminates many signs and reflexes used to assess anesthetic depth, autonomic nervous system changes (e.g., sudden changes in heart rate and blood pressure) can be indicators of pain related to an inadequate depth of anesthesia.

It is imperative that any proposed use of neuromuscular blocking (NMB) drugs be carefully evaluated by the veterinarian and IACUC to ensure the well-being of the animal. Acute stress is believed to be a consequence of paralysis in a conscious state and it is known that humans, if conscious, can experience distress when paralyzed with these drugs (NRC 2008; Van Sluyters and Oberdorfer 1991). If paralyzing agents are to be used, the appropriate amount of anesthetic should first be defined on the basis of...
results of a similar procedure using the anesthetic without a blocking agent (NRC 2003, 2008, 2009a).”

Animals anesthetized and paralyzed by NMB must be monitored by assessing heart rate and blood pressure to detect changes that might indicate additional anesthesia is required.

Depth of anesthesia must be monitored before paralysis, continuously during and after the paralytic period.

Parameters such as heart rate and blood pressure should be recorded every 15 minutes. Closer monitoring should be conducted around times of noxious stimulation.

Monitoring data must be available for review by the Institutional Animal Care and Use Committee (IACUC). In general, elevation in any vital parameter of 10%- 20% indicates the need for supplemental anesthesia. Guidelines for the administration of supplemental anesthesia based on blood pressure and heart rate changes must be developed and approved by the IACUC. Supplemental anesthesia must be administered until the baseline parameters are attained.

Monitoring data must also document the dose, time and route that all anesthetics, paralytics, and analgesics are administered. These records must be kept on file and readily available to regulatory and accrediting agencies such as the IACUC, USDA, and AAALAC.

**EXCEPTIONS**
Requests for exceptions to this Standard must be reviewed and approved by the IACUC.

**Definitions**

**IACUC**: Institutional Animal Care and Use Committee  
**DCM**: Division of Comparative Medicine  
**University Standard**: The minimum acceptable limits or rules used to achieve Policy implementation, enforceable by the IACUC.  
**NMB**: Neuromuscular Blocking Agents
Related Requirements

EXTERNAL REGULATIONS AND CONSEQUENCES

UNIVERSITY POLICIES, STANDARDS, AND PROCEDURES

For more detailed guidance, please refer to the University Policy on the Care and Use of Vertebrate Animals for Research, Training and Teaching Purposes.


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Important Dates

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Approved by: UNC IACUC

Dr. Roland Tisch
UNC IACUC Chair