UBC ANIMAL CARE COMMITTEE

POLICY 012

Policy and SOP for the Use of Neuromuscular Blocking Agents (NMBs) In All Species

Date Approved: August 25, 2008
Date Revised: June 7, 2016

Policy

Purpose:

The purpose of this document is to present requirements for appropriate use of neuromuscular blocking agents on anesthetized animals. This policy is accompanied by a Standard Operating Procedure, which is intended to guide investigators in how to use neuromuscular blocking agents in mammals.

Neuromuscular Blocking Agents (NMBA) or muscle relaxants act peripherally on the neuromuscular junctions. NMBAs include depolarizing agents (Succinylcholine) and competitive, non-depolarizing agents (curare, gallamine, atacurium, alcuronium, rocuronium, vecuronium and pancuronium). Although the use of NMBAs in human anesthesia is common, their use in animals can be more challenging due to difficulties in assessing anesthetic depth.

Please see Standard Operating Procedure for details of administration and monitoring.

POLICY STATEMENTS

1. Prior to using neuromuscular blocking drugs, investigators will be requested by the Animal Care Committee to demonstrate that the approach to using NMBAs is appropriate for the humane treatment of animals.

2. Due to the inherent difficulties in assessing the level of surgical anesthesia in animals treated with NMBAs, the use of these drugs requires a high degree of justification. The Animal Care Committee will only approve their use if: 1) it is established that the NMBAs are essential for the proposed research and (2) that the investigator is able to monitor the animals appropriately for signs of consciousness and pain.

3. Neuromuscular blocking (NMBAs) agents paralyze skeletal muscles but they do not produce loss of consciousness or analgesia. Therefore, the use of NMBAs in all studies must be in conjunction with adequate anesthesia to produce loss of consciousness and a

stable level of anaesthesia and adequate analgesia to provide and pain control for the duration of neuromuscular blockade in the species of animal used[1].

4. Investigators must be aware of the actions and interactions of the compounds to be used. Care must be taken in procedures in which autonomic function is altered because this will interfere with the normal cardiovascular responses during anaesthesia. This will limit the ability of monitoring the depth of anesthesia.

5. Only persons familiar with and trained in the use of NMBAs are permitted to use them in animals. A human observer must be present with the animal at all times.

6. Use of neuromuscular blocking agents should be confined solely to that phase of the procedure for which they are indicated.

7. Provision should be made for prompt administration of a narcotic or anesthetic agent in the event of return to consciousness.

8. For animals that are allowed to recover from anaesthesia, appropriate compounds must be used to reverse any residual neuromuscular blockade brought about by non-depolarising agents and an assessment should be made of neuromuscular function before return of consciousness is allowed to occur. If a depolarising agent is used, the full effects must have worn off before the return to consciousness.

9. Animals must be monitored during the recovery period until there is no risk that there could be a return to neuromuscular paralysis

References

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2. Canadian Council on Animal Care. 1993. Chapter 11. Anesthesia. *In* Guide to the Care and Use of Experimental Animals. Vol 1, 2nd Ed.

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4. Drummond JC, Todd MM, Saidman LJ. 1996. Use of neuromuscular blocking drugs in scientific investigations involving animal subjects: The benefit of the doubt goes to the animal. Anesthesiology 85: 697-699.

[1] Exceptional cases, such as the use of decerebrate animals, where adequate anesthesia will not be used may be approved by the Animal Care Committee on a case-by-case basis.

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6. Home Office 1986. Appendix H. Guidelines on the use of neuromuscular blocking agents. Guidance on the Operation of the Animals (Scientific Procedures) Act 1986. (UK)

7. Institute for Laboratory Animal Research Council. 2003. Guidelines for the Care and Use of Mammals in Neuroscience and Behavioral Research. National Academies Press: Washington DC http://grants.nih.gov/grants/olaw/National_Academies_Guidelines_for_Use_and_Care.pdf

8. Marsch SCU, Studer W. (1999) Guidelines for the use of Laboratory Animals: What about Neuromuscular blocking agents? Cardiovascular Research 42: 565-566.

9. Martin-Flores M, Sakai DM, Campoy L. and RD Gleed 2014. Recovery from neuromuscular block in dogs: restoration of spontaneous ventilation does not exclude residual blockade. Veterinary Anaesthesia and Analgesia 41: 269–277.

10. NIH 1991. Preparation and Maintenance of Higher Mammals During Neuroscience Experiments: Report of a National Institutes of Health Workshop, Bethesda, MD: NIH/National Eye Institute. www.cns.nyu.edu/~tony/Publications/NIH-booklet.pdf

11. University of Pennsylvania IACUC Guideline for Neuromuscular Blocking Agents. www.upenn.edu/regulatoryaffairs/Documents/neuromuscularblockingagents.pdf