

Animal Research Protection Program Policy

Post-Procedural and Post-Operative Care

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Background

During post-procedural and post-operative periods, animals may experience pain and are more vulnerable to environmental stressors. Frequent and careful observations by qualified personnel are critical to identify pain or distress. The objective is to minimize pain and distress as much as possible without compromising the scientific integrity of the research.

Scope

This policy applies to any animal used in teaching or research at OHSU that undergoes survival surgery or that may experience pain or distress following an experimental procedure. This policy applies to both acute and long term post-surgical and post-procedural care.

Policy

- I. All post-operative/procedural care must be described in the animal use protocol and approved by the IACUC.
- II. Post-operative and post-procedural care for all species during recovery from surgery or pain/distress-inducing experimental procedures will include appropriate analgesia (unless an exception is approved in the protocol) and nursing care, monitoring physiological functions and behavior, and observing for any complications. Consultation with Veterinary staff regarding prospective pain and discomfort is recommended.
- III. Animals should be observed for signs of pain or distress by individuals familiar with normal animal behavior as well as specific behavior that may be consistent with pain or distress in the species being evaluated.
- IV. Appropriate record keeping that documents animal recovery is required for USDA covered species and is suggested for non-USDA covered species.
- V. Post-operative and post-procedural care will be provided to the animal until it is fully recovered. The animal is considered fully recovered when it is eating and drinking normally and in the case of post-surgical recovery, incisional wound healing is complete and when applicable sutures are removed.
- VI. A DCM veterinarian must be consulted if any post-operative/procedural complications arise or if the animal does not appear to be recovering normally.
- VII. It is the investigator's responsibility to assure that appropriate post-surgical/procedural observations are made, and that the animal receives appropriate care during the post-surgical and post-procedural recovery period unless a surgical veterinarian takes responsibility for the case.

Procedures

Post-operative procedures for Nonhuman Primates on West Campus are delineated in DCM-W SOPs linked here [SR-034-03 Postoperative Care.pdf](#), [GL-075-00 Guideline for Anesthesia in NHPs.pdf](#). For Central and Waterfront Campuses and for rodents and rabbits on West Campus follow the procedures outlined below.

- I. Veterinary Oversight
 - A. Post-operative and post-procedural care are considered to be an aspect of adequate veterinary care as described in the Guide and the Animal Welfare Act Regulations.
 - B. DCM veterinary staff will be available to assist investigators in planning post-operative or post-procedural care.
 - C. The veterinary staff should observe the post-operative or post-procedural area as often as necessary, or as often as indicated in the approved protocol, to ensure adequate veterinary care, to examine post-operative records, and to consult with laboratory personnel providing post-operative/procedural

care.

II. Principal Investigator and Scientific Staff Responsibilities

1. Surgical or Anesthetic Recovery (acute)

- a. The need for monitoring will vary according to the type of surgery performed, anesthetic that was used, and species of animal.
- b. Animals are categorized in a certain stage of recovery as follows:
 - i. Stage 4: Animals are unconscious or semi-conscious, unable to sit up or maintain sternal recumbency. Most reflexes will be absent or severely diminished. Assessment of physiologic parameters should continue as was done during the surgical/anesthetic procedure.
 - ii. Stage 3: Animals are semi-conscious, but aroused when handled. Typically they will not be able to control body position. Return of reflexes continues and endotracheal tubes (if used) are usually removed in this stage when the gag/swallow reflex is present.
 - iii. Stage 2: Animals can, at minimum, maintain themselves in a sternal position. They may be able to stand or ambulate but show signs of sedation or ataxia.
 - iv. Stage 1: Animals function normally without any discernible effects from anesthetic event (unless directly altered by experimental procedure).
- c. Animals should never be left unattended until after extubation (if applicable) and sufficient recovery (stages 2-3).
- d. The following parameters (as applicable by species) should be observed until the animal recovers to Stage 2 (when the animal is extubated and able to reach food and water).
 - i. Stage 4 monitoring (every 15-30 min)
 - Body temperature
 - Heart rate and pulse character
 - Respiratory rate and pattern
 - Capillary refill time
 - Jaw tone - resistance or no resistance to opening
 - Response to toe pinch - withdrawal or non-withdrawal
 - Palpebral response to touching the medial canthus
 - Color of mucous membranes at gums or conjunctiva
 - Examine closely for other abnormalities
 - ii. Stage 3 monitoring (every 1 hour)
 - Body temperature
 - Capillary refill time
 - Color of mucous membranes at gums or conjunctiva
 - Attitude and activity
 - Condition of the operative site
 - Examine closely for other abnormalities
- e. At a minimum, recovery records should indicate the time at which the animal was examined, the person who examined the animal, and any findings that were abnormal. Surgical and/or anesthetic records should be readily available for the veterinary team or IACUC review.
- f. Extubation should be performed when swallowing reflex has returned. Time of extubation should be recorded.
- g. Small animals should be turned from side to side periodically to help prevent pulmonary hypostatic congestion.
- h. Ambient temperature should be adjusted by increasing room temperature or cautiously using circulating warm water blankets or heat lamps (close monitoring is required when using heat lamps to prevent heat stress). The animal should be kept dry and free of excreta and drapes or towels should be placed between the animal and cold surfaces. In addition, post-op fluids can be warmed prior to administration, especially in small animals.
- i. Careful attention should be placed on assessing pain and distress in the animals during recovery from anesthesia, especially for major surgeries or any procedure likely to cause pain. Administration

of analgesics must be provided as described in the approved protocol or at the discretion of the attending veterinarian.

- j. Hydration should be assessed and fluid replacement administered at a volume of 10-40 ml/kg body weight for animals that are not eating and drinking post-operatively/procedurally. Fluids may be given parenterally, either subcutaneously, intraperitoneally or intravenously (IV rate of 10-40 ml/kg/h in larger animals). Lactated ringers solution or equivalent crystalloid should be utilized.
 - k. Animals can be returned to their housing area when they are sternal and able to ambulate in a manner that allows them to safely obtain food and water.
2. Surgical or Anesthetic Recovery (long-term)
- a. General well-being of the animal should be monitored daily and the post-surgical/anesthetic record continued at a frequency appropriate for the procedure (until removal of sutures if surgery was performed) and should include the following:
 - i. Visual confirmation of eating and drinking
 - ii. General appearance of animals (e.g. sunken appearance, rough hair coat)
 - iii. Attitude and activity (e.g. alert or lethargic)
 - iv. Presence of stool or urine
 - v. Condition of operative site if applicable (e.g. wound healing, dehiscence, etc.)
 - vi. Any other notable abnormalities (related or unrelated to the procedure)
 - b. Continue assessment of pain and distress with a frequency appropriate for the procedure and possible complications associated with it. Consultation with the veterinarians may help determine the best post-operative pain monitoring schedule when writing a protocol.
 - c. Any concerns with the well-being of the animal during the post-procedural/surgical monitoring period should be brought to the attention of the veterinary team to determine if additional care is required.

Authority

Guide for the Care and Use of Laboratory Animals, 8th Edition

PHS Policy

AWA Regulations

References

Guide pp115-124

AWA Regulations 2.31,d,ix