NON-RODENT SURGERY

1. PURPOSE

1.1. The purpose of this Animal Care and Use Procedure (ACUP) is to describe procedures for general non-rodent surgery. This ACUP is approved by the Cornell IACUC (Institutional Animal Care and Use Committee). Any deviation must be approved by the IACUC prior to its implementation.

2. SCOPE

2.1. This ACUP is intended for use by qualified personnel on an IACUC approved protocol who will be performing major surgery on non-rodent species, or assisting in those procedures at Cornell University.

3. INTRODUCTION

3.1. This document outlines pre-, peri-, and post-operative procedures for surgery performed on non-rodent, USDA covered species. This ACUP does not apply to the following mammals: mice, rats, hamsters, guinea pigs, chinchillas, and gerbils. These are basic guidelines and are to be used in accompaniment with training. Contact CARE at care@cornell.edu for more information or for assistance.

4. MATERIALS AND EQUIPMENT

4.1. Animal Procedure / Health Records
4.2. Analgesics and anesthetics
4.3. Electric clippers
4.4. Gauze
4.5. Antiseptic detergent (e.g., chlorhexidine, povidone iodine)
4.6. 70% alcohol
4.7. Sterilization equipment
4.8. Sterile surgical equipment and draping
4.9. Wound closure materials (e.g., suture, tissue glue, etc.)
4.10. IV fluids
4.11. Patient monitoring equipment (e.g., stethoscope, thermometer, pulse oximeter, etc.)
4.12. Supplemental heat source
4.13. Clean scrubs, shoe covers, surgical mask, bonnet, sterile gown, sterile gloves
4.14. Emergency airway equipment
4.15. Intubation and catheterization equipment, needles, and syringes

5. PROCEDURE

NOTE: Perform non-rodent surgery using aseptic procedures consistent with the Guide for the Care and Use of Laboratory Animals and the Animal Welfare Regulations, in a dedicated surgical suite. This includes documenting all animal procedures and anesthesia observational parameters.

5.1. Surgical Principles

NOTE: Expired surgical materials or pharmaceuticals cannot be used in, or applied to, animals undergoing survival procedures. See ACUP 210 Non-Survival Surgery for applicable restrictions with non-survival procedures.

5.1.1. General Principles

5.1.1.1. Clean and disinfect all surfaces and equipment in the dedicated surgical suite.
5.1.1.2. Ensure that all required materials are ready and at hand.
5.1.1.3. Minimize traffic flow in the surgical area when the surgery is being performed.

5.1.2. Sterilization of Surgical Supplies:

5.1.2.1. Sterilize all necessary instruments (e.g., gauze, drapes, etc.) prior to surgery.

5.1.2.1.1. Clean instruments prior to sterilization to remove organic material.
5.1.2.1.2. Wrap or package instruments in appropriate packs. Include a sterilization indicator in the pack, if a dog spay pack or larger, and an indicator on the outside of the pack to validate the package and its contents are exposed to sterilization conditions.
5.1.2.1.3. Date the packs upon sterilization and store in a manner that prevents package exposure to moisture, dust, and damage (e.g., a clean cabinet in an environmentally controlled room). Items stored in this manner, without damage to the outer package, retain sterility indefinitely.
5.1.2.1.4. Items not stored to prevent the above package exposures must be used within six months of the sterilization date.

5.1.2.2. Achieve sterilization by autoclaving (steam) or gas sterilization (e.g., ethylene oxide or hydrogen peroxide vapor).
5.1.2.3. Prior to opening and using sterilized supplies, visually inspect the package. Do not use package contents if the outer temperature / chemical indicator has not changed to the appropriate color or the package shows signs of water or physical damage.
5.1.2.4. Upon opening the package, visually inspect the inner temperature / chemical indicator, if present. Do not use package contents if indicator has not changed to the appropriate color.

5.1.3. Surgical Attire and Aseptic Technique:

5.1.3.1. Surgeon and Surgical Assistant Attire:

5.1.3.1.1. Wear clean scrubs, surgical mask, bonnet, sterile gown, and sterile gloves (shoe covers are optional).

5.1.3.1.2. DO NOT TOUCH NON-STERILE SURFACES. Replace instruments and/or re-glove hands that touch non-sterile surfaces.

5.1.3.2. Observers / Anesthetist Attire:

5.1.3.2.1. Wear clean scrubs, bonnet, disposable gloves, and a surgical mask (shoe covers are optional).

5.2. Preoperative Care

5.2.1. Perform a complete veterinary preoperative physical examination on the surgical subject.

5.2.2. Calculate the dosage of emergency drugs before the start of anesthesia.

5.2.3. Administer analgesics according to ACUP 102 Analgesia and approved by the IACUC.

5.2.4. Anesthetize the animal, in an area designated for surgical preparation and anesthesia, according to applicable ACUPs. For example:

5.2.4.1. ACUP 103 Rabbit Anesthesia
5.2.4.2. ACUP 104 Cat and Dog Anesthesia

NOTE: Contact CARE staff at care@cornell.edu for guidance regarding anesthesia administration for species not listed above.

5.2.5. Apply ophthalmic ointment to both eyes to prevent corneal desiccation.

5.2.6. Shave an area approximately twice the size of the anticipated surgical field with electric clippers. Remove all loose hair and debris from the animal.

5.2.7. Clean the surgical area with gauze and a disinfectant scrub (e.g., povidone iodine or chlorhexidine) to remove debris from the surgical site.

5.2.8. Antiseptic Patient Preparation:

5.2.8.1. Use aseptic technique when performing skin antisepsis.

5.2.8.2. Start antiseptic application at the center of the surgical site and move to the outside of the prepared area in a circular manner.

Perform a minimum of three scrubs with an antiseptic soap solution (e.g., chlorhexidine scrub as per manufacturer’s recommendations) and a minimum of three alternating rinses with a non-soap antiseptic solution (e.g., alcohol and/or chlorhexidine solution).
NOTE: Perform more than three scrubs / rinses if deemed necessary in order to obtain an aseptic surgical site.

5.2.9. Transfer the patient to the designated surgical suite only after the animal has been shaved and cleaned with a disinfectant scrub.

5.3. Monitoring, and Supportive Care

5.3.1. Administer IV fluids to animals anesthetized longer than 30 minutes to maintain adequate hydration.
5.3.2. Maintain normal body temperature by the use of warm circulating water blankets, thermal pads, and/or warmed IV fluids.

NOTE: Do not use an “over the counter” electric heating pad as these are prone to overheating.

5.3.3. Maintain aseptic conditions during all survival procedures.
5.3.4. Continuously monitor heart rate, respiratory rate, blood pressure, and periodically monitor temperature.
5.3.5. Document these parameters at least every 15 minutes.

NOTE: More frequent (e.g., every 5 minutes) documentation of vitals is suggested, if possible.

5.3.6. Monitor hemodynamic parameters to assure adequate gas exchange.

5.3.6.1. Mucous membranes should be pink and moist.
5.3.6.2. Capillary refill time should be less than 2 seconds.
5.3.6.3. Promptly notify the surgeon if the animal is not within acceptable parameters for that species.

5.3.7. Adjust the depth of anesthesia according to the monitored parameters (e.g., patient reflexes, respiratory rate and breathing pattern, heart rate, and/or blood pressure).
5.3.8. In the case of respiratory or cardiac arrest, stop anesthesia, administer oxygen, and begin resuscitation efforts immediately.

5.4. Surgical Procedures

5.4.1. Use efficient surgical planning to decrease surgical time, tissue contamination, and tissue damage. Handle tissues atraumatically whenever possible.
5.4.2. Sterile surgical draping:

5.4.2.1. Drape the animal with a sterile, impermeable covering to surround the disinfected area.
5.4.2.2. Fix the drape in place.
5.4.2.3. Cover a stand or table with a sterile drape on which sterile equipment is placed.
NOTE: These tasks are performed by the gloved and gowned surgical team.

5.4.3. Maintain aseptic conditions during all survival procedures.
5.4.4. Prior to starting surgery, verify the anesthetist has confirmed that depth of anesthesia is sufficient (e.g., loss of palpebral reflex, pedal withdrawal reflex, and jaw tone).
5.4.5. Suture and suturing:

5.4.5.1. Do not use braided suture transdermally.
5.4.5.2. When possible, avoid use of epidermal sutures as this can cause an animal to chew or scratch at the incision site thereby increasing the risk of post-operative complications.

5.5. Postoperative Care

NOTE: Postoperative care begins with recovery from anesthesia, and may extend from days to weeks depending on post-surgical outcomes.

5.5.1. Recover the animal in a clean, quiet environment.
5.5.2. Place recovering animal in a safe enclosure, without other animals.
5.5.3. Continuously observe the animal and periodically monitor temperature, heart rate and respiratory rate until the animal regains a gag reflex and is capable of sternal recumbency. Emergency airway equipment must be available in the anesthetic recovery area. Administer oxygen and/or respiratory support if either apnea or hypoxia is observed.
5.5.4. Keep the animal warm and dry to minimize hypothermia.
5.5.5. Administer analgesics post-surgically and for the next 48 hours or longer, as outlined in ACUP 102 Analgesia. Administering analgesia for less than 48 hours post-operative must be justified and detailed in the IACUC approved protocol.
5.5.6. Determine the need for further supportive care such as fluids, electrolytes, antibiotics, etc., based on the animal’s condition and the procedure performed.
5.5.7. Examine the wound daily until completely healed.
5.5.8. Remove skin sutures (if any) after 10-14 days.

5.6. Record Keeping


6. PERSONNEL SAFETY

6.1. Medical Emergencies: CALL 911.
6.2. When working with animals wear appropriate PPE, observe proper hygiene, and be aware of allergy, zoonosis, and injury risks. Refer to the CARE Occupational Health and Safety webpage for more information.
6.3. Monitor the use of chemical agents and assure that product safety recommendations are followed to protect the health and welfare of the humans and animals that are exposed to the agents.

6.4. Contact Cornell Environmental Health and Safety at dehs-mailbox@cornell.edu or (607) 255-8200 for concerns regarding the use of chemical agents, including:

6.4.1. Use of controlled substances.
6.4.2. Human health concerns related to chemical exposure, e.g., waste anesthetic gases (WAGs), see also ACUP 712 Waste Anesthetic Gas Scavenging Systems.

7. ANIMAL RELATED CONTINGENCIES

7.1. Post contact information for emergency assistance in a conspicuous location within the animal facility.

7.2. Non-emergency veterinary questions and requests for care, email CARE veterinary staff at care@cornell.edu.

7.3. Emergency veterinary care is available at all times including after working hours and on weekends and holidays.

7.3.1. Biomedical settings: CARE pager (1-800-329-2456).
7.3.2. Farm animal settings: Ambulatory and Production Medicine Service at (607) 253-3140.

8. REFERENCES

8.4. CARE Anesthesia Record Form
8.6. ACUP 102 Analgesia: [http://ras.research.cornell.edu/care/documents_k/ACUPs/ACUP102.pdf](http://ras.research.cornell.edu/care/documents_k/ACUPs/ACUP102.pdf)
8.7. ACUP 103 Rabbit Anesthesia: [http://ras.research.cornell.edu/care/documents_k/ACUPs/ACUP103.pdf](http://ras.research.cornell.edu/care/documents_k/ACUPs/ACUP103.pdf)
8.8. ACUP 104 Cat and Dog Anesthesia: [http://ras.research.cornell.edu/care/documents_k/ACUPs/ACUP104.pdf](http://ras.research.cornell.edu/care/documents_k/ACUPs/ACUP104.pdf)
8.11. CARE Occupational Health and Safety webpage:
http://ras.research.cornell.edu/care/OHS.html

9. APPENDIX

9.1. None

10. HISTORY

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 JUL 18</td>
<td>Most Recent Annual Review – Reviewed by: B. Burke</td>
</tr>
<tr>
<td>31 AUG 16</td>
<td>Removed the word “General” from the title – J. Kirby</td>
</tr>
<tr>
<td>28 OCT 15</td>
<td>New Format – Converted by: J. Kirby</td>
</tr>
<tr>
<td>31 JAN 12</td>
<td>Revised – Revision Author: Dr. T. Pavek</td>
</tr>
<tr>
<td>31 MAY 08</td>
<td>New Issued – Original Author: Dr. E. Daugherity; Referee: Dr. B. Singh</td>
</tr>
</tbody>
</table>