

POLICY ON ASEPTIC RECOVERY SURGERY ON USDA REGULATED NONRODENT SPECIES

Adopted by the University Committee on Animal Resources

Approved 5-15-2024

The USDA Animal Welfare Act (9 CFR) requires use of aseptic technique when performing major and minor invasive recovery surgery on USDA-regulated species. Major invasive surgery includes penetration and exposure of the cranium, thorax, abdomen or any procedure producing permanent impairment of physical or physiological functions. Minor invasive surgery does not penetrate a body cavity and includes relatively minor operative procedures such as blood vessel cut down, corneal surgery and eye coil implantation. As required by the U.S. Public Health Service and the University Committee on Animal Resources (UCAR), all vertebrate animal-use protocols, regardless of the funding source, must comply with the guidelines stated in the *Guide* and the requirements of the USDA Animal Welfare Act.

This policy refers to USDA regulated nonrodent species. If you are working with any rodents covered by USDA regulations such as gerbils, mole rats, spiny mice, hamsters or prairie voles, please refer to the Policy on Aseptic Recovery Surgery on Rodents and Birds.

Investigators who believe that their nonrodent USDA regulated animals require exceptions to the *Guide* recommendations or USDA requirements should contact UCAR for assistance. Otherwise, investigators using these species are expected to follow this policy.

MAJOR INVASIVE SURGERY

Pre-Operative Animal Preparation

Most animals must be fasted 4 to 20 hours prior to general anesthesia to empty the stomach of ingesta. Free choice water is made available prior to surgery, unless otherwise described and approved in the protocol (e.g. small ruminants). . To prevent over-consumption, water scheduled animals must carefully be transitioned to ad-lib water by the day prior to surgery. Because they cannot vomit, rabbits do not require fasting unless there is a need to empty the stomach for an abdominal surgical procedure.

Under most circumstances, animals receive the first dose of an anesthetic drug within their home cages using a squeeze cage for macaques or manual restraint for animals which are safe to handle, such as new world primates, rabbits, dogs, cats, and farm animals.

Animal preparation must be performed in a dedicated, physically separated area from the Operating Room. Hair must be removed from the surgical site with clippers or depilatory cream. The surgical site must be disinfected with the following two-step process repeated three times:

1. Application of a surgical scrub (chlorhexidine or povidone iodine scrub) at the surgical site using appropriately sized gauze sponges starting from the center of the shaved surgical site moving outward.
2. Application of antiseptic solution (povidone iodine or chlorhexidine solution) using appropriately sized gauze sponges starting from the center of the surgical site moving outward.

Operating Room & Aseptic Technique

Surgery must be conducted in an Operating Room (O.R.) physically separated from the other functional zones (Animal Prep, Surgeon Prep, Instrument Prep and Recovery). Air pressure differential for the O.R. must be positive to all other adjacent spaces.

A sterile drape is required over the surgical site to avoid sterile instruments, sterile gloves and exposed viscera from coming in contact with unprepped areas.

The surgeon must maintain aseptic technique by only touching sterile instruments or sterile surfaces. If the surgeon breaks aseptic technique by touching a nonsterile surface, he/she must don new sterile gloves.

Patient Monitoring & Support

Monitoring of anesthesia must be documented using the ANESTHESIA RECORD/SURGERY LOG (<https://www.urmc.rochester.edu/animal-resource/forms/dcm-forms.aspx>).

A dedicated anesthetist must observe mucous membrane color, respiratory rate and pattern, body temperature and monitor for the loss of pedal, corneal and pinna (external ear) reflexes, and document on the anesthesia record at least every 15 minutes while the patient is anesthetized. More sophisticated methods of patient monitoring including EKG, pulse oximetry, end tidal CO₂, blood pressure measurements and blood gas measurements are highly recommended.

To prevent hypothermia, heat support (e.g. Bair hugger, circulating warm water blanket) must be provided throughout general anesthesia, unless the animal is at risk of becoming hyperthermic based on body temperature measurements.

Instrument Preparation and Area

All instruments must be sterilized, but the method of choice may vary depending upon the surgical instruments or devices used. Acceptable sterilization techniques include autoclaving using steam under pressure, vaporized hydrogen peroxide (VHP) sterilization, ethylene oxide (EO) or cold sterilization. Approved cold sterilization methods include: soaking instruments in 2.5 – 3.5% glutaraldehyde (e.g. Cidex Plus for 10 hrs. at 20-25° C) or 7.5% hydrogen peroxide (e.g. Sporox Sterilizing and Disinfection Solution for 6 hours at 20° C) according to manufacturer's instructions.

Instruments may be cleaned, wrapped and sterilized in a room separate from the animal prep room and the O.R. or may share the surgeon prep room as long as a different sink is used for each function.

Monitoring of Sterilization Equipment

Heat sensitive chemical indicators must be used to verify that surgical instruments and other materials are appropriately sterilized by an autoclave. Investigators must use one autoclave integrator strip in each pack to be autoclaved. The strip should be placed in a location considered to be the hardest for the steam to reach. Place autoclave tape on the pack surface. Contact DCM for more information about these methods.

When other methods of sterilization (e.g. EO, VHP) are used, appropriate indicator strips/tapes must be used in a similar fashion as described above for autoclaved materials.

The date of sterilization must be indicated on the outside of the pack. Sterilized packs have a 6-month shelf life as long as the packaging does not become wet or damaged. Packs that become damaged, wet, or that are 6 months past the sterilization date must be rewrapped and re-sterilized prior to use.

Surgeon Pre-Operative Preparation and Area

The surgeon pre-operative preparation area must be physically separated from the pre-operative animal preparation area and the operating room. The area may be shared with instrument preparation, but separate sinks are required.

The surgeon must don a face mask, cap, shoe covers and surgical scrub top and bottom before scrubbing hands. The surgeon must wash his/her hands with an antiseptic surgical scrub for a minimum of three minutes using ten scrubs per surface working from the fingertips toward the elbows and then aseptically don a sterile gown followed by sterile gloves.

Surgical Site Closure

The muscle layer is to be closed with absorbable suture material. The skin should be closed with staples or with a nonabsorbable suture material in a simple interrupted pattern or absorbable sutures in a continuous subcuticular pattern. Absorbable sutures placed in a subcuticular pattern to close the skin need not be removed postoperatively since they are buried under the skin. All other skin sutures or staples should be removed ten to fourteen days after surgery. Investigators should consult with veterinary staff regarding appropriate closure techniques if not familiar with the models.

Animal Recovery and Area

Recovery from a surgical plane of anesthesia may be staged with first steps occurring in the O.R. where physiological parameters (heart rate, PO₂, respiratory rate, return of reflexes, ..) may be safely monitored. Final stages of recovery may occur in the animal room enclosure (e.g. primates) or in the animal preparation area in a recovery transport cart (e.g. rabbit, dog, cat, swine) before being returned to the animal housing room.

Criteria for assessing when it is safe to remove the endotracheal tube include: an easily elicited tracheal cough, an increase in jaw tone and resumption of swallowing activity.

Animals should be recovered from anesthesia in a warmed environment. Post-procedural or anesthetized animals may not be left unattended until fully recovered, able to ambulate, with pink mucous membranes and stable respirations. Close observation provides the opportunity for early detection and response to potentially life-threatening problems.

Submit completed anesthetic records to DCM when animal is returned to housing in stable condition and can be left alone.

The responsible individual must record the time the animal is returned to housing on the DCM Post-Op/Anesthetic Recovery Record (<https://www.urmc.rochester.edu/animal-resource/forms/dcm-forms.aspx>). The person must also describe the animal's condition by recording the quality and/or rate of respirations, mucous membrane color and/or capillary refill time and the response of various reflexes (e.g. palpebral, corneal, righting reflexes) and quality of jaw tone. Pertinent intra-operative complications, post-operative orders or observations must be recorded on the Post-Op Chart. The individual writing post-operative orders must make sure that antibiotic and/or analgesic agents, dosages, routes and treatment intervals are included on the chart. Investigators must designate who is responsible for providing post-op medication (DCM or PI's Staff). Post-op orders must be the same as those stated in the UCAR protocol or as directed by a DCM veterinarian. The Anesthetic and Post-Op Records must be delivered to Animal Resource office (G6708) during working hours or the DCM Record Box (G6721 door) after business hours. Alternatively, records may be submitted electronically via e-mail to DLAMtechs@urmc.rochester.edu.

The DCM veterinary staff routinely monitors all post-op USDA regulated nonrodent species for a minimum of three days after surgery. During this time, the investigator will be informed of any complications observed. **MINOR INVASIVE RECOVERY SURGERY**

Pre-operative animal and surgeon preparation and intra-operative procedures for minor invasive surgery on regulated species does not require a dedicated room. Surgeons must wear sterile gloves, mask, and surgical cap and use sterile surgical instruments. Animal preparation techniques, aseptic procedures, anesthetic depth monitoring, recovery methods and the associated documentation must be followed as described for major invasive surgery above.

ANESTHETICS AND ANALGESICS

Anesthetics and analgesics must be administered as described in the UCAR-approved protocol. Systemic analgesics should be administered to all species experiencing major survival surgical procedures for a minimum of three days following surgery. Animals undergoing minor procedures that may result in post-op discomfort must also receive analgesics. Analgesics administered prior to the surgical manipulation are beneficial for pain relief in laboratory animals; therefore pre-emptive analgesic therapy is required. Drugs must be given at the dosing interval stated in the UCAR protocol. The decision to discontinue analgesic therapy should be made based on the observation that the animal appears to be comfortable at the end of the previous dosing interval (i.e. when the next analgesic treatment is due).

The following formulary contains standard drugs used and recommended by DCM veterinary staff. This formulary may be adjusted as new drugs are discovered or new research indicates more effective and/or safer analgesic drugs in these species. Investigators should consult with a veterinarian when planning a protocol for the most appropriate anesthetic and analgesic regimen specific to that surgical procedure and research use. Please refer to the [Sedation/Tranquilization, Anesthesia and Analgesia in Laboratory Animals and Veterinarian-Recommended Formularies](#) or contact a DCM veterinarian (X5-2653).