

STANDARD OPERATING PROCEDURES

DIVISION OF COMPARATIVE MEDICINE
UNIVERSITY OF SOUTH FLORIDA

SOP#: 033

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TITLE:	General Anesthetic Techniques
SCOPE:	All Authorized Personnel
RESPONSIBILITY:	Facility Manager and Technical Staff
PURPOSE:	To Outline Appropriate and Safe Anesthetic Monitoring Techniques

I. PURPOSE

1. To describe universally accepted best practices when utilizing general anesthesia in an animal model.

II. RESPONSIBILITY

1. The Training Coordinator and Assistant Directors/Veterinary staff is responsible for training and supervising personnel regarding the proper implementation of this SOP.
2. The Assistant Directors/Veterinary staff reviews anesthesia administration route (e.g., face mask, intubation), evaluates associated risks to both animal patient and staff, and makes recommendations to reduce exposures as needed.
3. It is the responsibility of personnel anesthetizing research animals to be familiar with these procedures.

III. BACKGROUND INFORMATION

1. Isoflurane and sevoflurane are common halogenated anesthetic gases.
 - a. Halogenated anesthetics are typically clear, colorless, highly volatile liquids at ordinary pressure and temperature. Consequently, these gases possess very poor warning properties, and odor is not an adequate indication of overexposure.
 - b. Exposure to these agents occurs when vapors escape into the work place during the process of anesthetic administration.
 - c. Potential for health risks in the unscavenged anesthetic environment necessitates that waste anesthetic gas be scavenged and exposures to waste anesthetic gas be kept to the lowest practical level. Please refer to SOP #909 Anesthetic Gas Monitoring and Safety Practices .
2. Surgical areas are physically separated from corridors and animal housing areas. Procedural and surgical area air flows and pressure gradients are adjusted so that they are positive and airflow is toward the adjoining corridors. Information on decontamination of procedural space, room configuration and requirements are based on species involved and can be found in SOPs #003 Facilities for Aseptic Surgery for Non-rodent USDA , #1009 Decontamination , #1015 Decontamination of Common Procedural Areas

IV. PROCEDURES

1. IACUC protocol is reviewed to ensure compliance with approved methods, drugs and manipulations.
2. Anesthesia equipment must be routinely inspected and maintained as described per appropriate equipment specific SOP(s). Prior to using an anesthesia machine,

- a. Visually inspect hoses and connections,
 - b. Connect the waste gas scavenging system,
 - c. Test breathing circuit for leaks, and verify that it can maintain positive pressure,
 - d. Ensure adequate oxygen and anesthetic agent supplies are available
3. Prior to anesthetizing an animal patient, all monitoring and supplemental support equipment should be operational and in good working order per appropriate equipment specific SOP(s). Prior to using monitoring equipment,
- a. Visually inspect sensor and electrical connections
 - b. Clean all sensors prior to and after use
 - c. Allow ample time to run internal calibrations and tests per appropriate SOP
4. Pre-procedural Considerations
- a. Examination
 1. Overall condition
 2. Weight taken within the past 24hrs
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1. Assess appropriate length (measure from corner of mouth to last rib palpated), trim if needed, ensuring no sharp edges.
 2. Test inflation cuff, if one is available, then deflate completely; ensure all connections are secured and will not dislodge during surgery.
 - a. Rodents = non-cuffed, typically made of flexible tubing, or trimmed percutaneous vascular catheters.
 - b. Rabbits = size 2.5-4.0 is normal range; generally 3.0 are non-cuffed; 3.5 are cuffed.
 - c. Large Animals = size 4.0 and greater; generally come cuffed.
 - c. The larynx can be easily damaged during intubation; therefore, if one encounters difficulty, causes obvious trauma and or has not successfully placed the tube within 3 attempts, a more experienced technician will take over.
 - d. Endotracheal tube must be secured; typically with roll gauze in larger species, while adhesive or umbilical tape will suffice in rodent species. Inflation cuff, if available, is blown up until firm but not overly tight (e.g.: "grape-like" consistency).
7. Peripheral Vascular Catheterization
- a. Choose appropriately sized catheters for species and intended use (e.g.: fluid administration, invasive blood pressure monitoring).
 - b. Vessels can vasospasm or form hematomas if damaged while attempting to place catheters. If one encounters difficulty, causes obvious trauma and or has not successfully placed the catheter within 3 attempts, a more experienced technician will take over.
8. Urinary Catheterization
- a. Choose appropriately sized catheters for species and research requirements.
 - b. Apply viscous Lidocaine 2% or Cetacaine gel as topical anesthetic prior to catheterization attempts to both the urethral opening and catheter tip.
 - c. Swelling may occur if urethra is damaged during catheterization attempts, resulting in bleeding and obscuring the opening. If successful placement of the catheter is not achieved within 3 attempts, a more experienced technician will take over.
9. Monitoring Methods
- a. Ventilation
 1. Small animals are assessed by visual monitoring of mucous membrane color and tissue perfusion
 2. Large animals are also monitored using specialized equipment
 - a. Pulseoximetry (SpO₂)
 - b. Capnography (end-tidal CO₂ or ETCO₂)
 - c. Arterial or venous blood gas analysis
 - b. Thermoregulation
 1. Table probe
 2. Nasal, auricular or rectal probe
 - c. Heart rate, pulse and ECG – in rodents rate and pulse characteristics can be assessed by visualization of vasculature; larger animals will have probes, clips or cuffs affixed.
 - d. Respiratory rate - in rodents rate, depth and pattern characteristics are assessed via direct observation; large animals will be monitored via probes, clips or cuffs affixed.
 - e. Blood pressure
 1. Invasive – via arterial catheter attached to transducer
 2. Non-invasive
 - a. Rodent = CODA Non-Invasive Blood Pressure (NIBP) System
 - b. Large animal = variety of cuff systems

- f. Physical monitoring
- g. Perfusion - capillary refill time
- h. Depth of anesthesia
 - 1. Jaw tone
 - 2. Palpebral or blink response
 - 3. Deep pinch/noxious stimuli

10. Monitoring Specifics

- a. Data collection of parameters appropriate to the protocol will be taken a minimum of every 15 minutes.