Anesthetic Considerations for Feline Patients

Cats are challenging to anesthetize because of their size, behavior and unique metabolism of anesthetic/analgesic medications. Choice of pre-anesthetic medications, induction agents, drugs used for maintenance of anesthesia, and analgesics for cats depends upon patient temperament, presence of underlying disease, expected intensity of pain, and duration of the procedure.

Cats are at risk of developing hypotension, hypothermia, hypoventilation and hypoxemia in the peri-anesthetic time period. Regardless of drug choice, close monitoring the patient’s vital signs and response to anesthesia cannot be overemphasized. The presence of a dedicated, knowledgeable anesthetist aids in prompt recognition and treatment of complications that arise.

Guidelines for feline anesthesia & sedation

1. Administer pre-anesthetic medications to achieve analgesia, reduce anesthetic requirements and minimize stress – even and especially in fractious cats. Opioid analgesics (buprenorphine, morphine, hydromorphone, butorphanol) with or without acepromazine are common pre-anesthetics for cats. Avoid use of alpha-2 agonists in elderly or ill patients due to profound cardiovascular depression. Use of acepromazine should be reserved for patients with anxiety and minimal underlying disease.

2. Induction agents: Pre-oxygenation is beneficial prior to induction of anesthesia in all patients, particularly those with underlying disease. Ketamine should not be used to induce anesthesia in feline patients with hypertrophic cardiomyopathy. Avoiding ketamine is recommended for patients with neurologic disease or renal insufficiency because of the drug’s potential to cause seizure-like activity and its dependence upon renal excretion for clearance, respectively.

3. Box or mask inductions should be avoided. Use of an inhalant for induction of anesthesia is 1) dangerous to the patient (exposure to high levels of potent cardio-respiratory depressant, inability to monitor and support cardiovascular or respiratory system during induction, increased mortality), 2) dangerous to personnel (exposure to inhalants associated with numerous adverse health effects including impaired reproductive function), and 3) expensive. If must use inhalant to induce unconsciousness, be sure and pre-medicate the patient!

4. Endotracheal intubation is recommended for all patients who are at a surgical plane of anesthesia because at this depth of anesthesia they lose protective airway reflexes. I.e., if you are able to perform surgery, your patient is unable to protect their airway. Protection of the airway with an endotracheal tube and supplemental oxygen is important in patients anesthetized with all-injectable anesthesia protocols (example: “kitty magic” = dexmedetomidine + ketamine + opioid).

- Use care when intubating cats: visualize the larynx using a laryngoscope, apply 0.1 – 0.2 ml of 2% lidocaine to the arytenoids cartilages, then gently insert the endotracheal tube.
- Test the seal of the endotracheal tube cuff after intubation by delivering a breath to your patient and insuring that there is a slight leak at 20 cmH₂O but no leak at lower inflation pressures.
- Disconnect the endotracheal tube from the anesthetic breathing circuit when moving patients (i.e., changing position) to minimize the potential for tracheal tears.
Guidelines for feline anesthesia & sedation, continued

5. Anesthetic maintenance: Isoflurane and sevoflurane are both potent cardiovascular and respiratory depressants. Balanced anesthetic techniques (i.e., analgesic drugs plus inhalant) are beneficial for compromised patients because they reduce the requirements for inhalant anesthesia and, thus, minimize cardiovascular depression.

6. Routine use of local anesthetics (eg., bupivacaine) to provide site-specific anesthesia and analgesia (dental nerve blocks, ring blocks, incisional blocks, testicular blocks) is strongly recommended in cats. Calculate maximum dose (bupivacaine = 2 mg/kg).

7. Proactive thermal support with an active warming device will help prevent heat loss and minimize hypothermia in these small patients. Cold patients are at risk of developing rebound hyperthermia during recovery, and many other adverse effects of hypothermia: prolonged recovery, impaired cardiovascular function, increased infection rates, increased bleeding, risk of cardiac arrest, etc.

8. Sedation: Butorphanol, dexmedetomidine, acepromazine or ketamine are often used to produce chemical sedation in cats. Small doses of ketamine (1 – 2 mg/kg) may be used with an opioid to achieve sedation. In elderly or compromised patients, butorphanol with or without midazolam is the sedative I choose to use.

9. Systemic analgesia: Anticipated pain intensity guides peri-operative analgesic therapy. For procedures associated with mild pain (routine dental prophy, small lump removal), single analgesic therapy may be adequate (meloxicam or butorphanol). For procedures associated with moderate pain (ovariohysterectomy, dental extractions, castration), the use of multimodal analgesia is appropriate (NSAIDs + local anesthetics, partial opioid agonists). Multimodal analgesic techniques that incorporate full-mu opioid agonists like hydromorphone plus local anesthetic blocks and NSAIDs are strongly recommended for procedures associated with severe pain (full-mouth extractions, onychectomy, amputation).

10. Monitor anesthetic depth, cardiovascular function and respiratory function.

   ➢ Inhaled anesthetic agents are potent cardiovascular and respiratory depressants. Hypotension is a common complication in anesthetized cats. Monitor anesthetic depth to minimize the dose-dependent cardiovascular depression caused by inhalants. Provide IV fluid support (5 ml/kg/hr) with a balanced polyionic solution.

   ➢ Monitoring blood pressure allows the anesthetist to promptly recognize and treat hypotension. Hypothermia can exacerbate hypotension.

Resources on Cat-friendly practices and Stress-free handling:

- AAFP’s Guideline publications on Feline Friendly Handling & Getting Your Cat to the Veterinarian: http://catvets.com/professionals/guidelines/publications/


- The Feline Advisory Board’s two manuals on Creating a Cat Friendly Practice: http://www.fabcats.org/publications/#cfp1

- CATalyst Council’s Cat-Friendly Practice – short presentations for download: http://www.catalystcouncil.org/resources/health_welfare/cat_friendly_practices/
The fearful/fractious cat

Remember that most fractious cats are FEARFUL cats, so make necessary changes to patient handling and housing in order to minimize fear and anxiety for these patients. Consider a multi-step premedication approach, outlined below, to avoid box inductions in cats.

➤ In order for this strategy to be successful, staff members need to be able to easily identify fearful cats at the time the appointment is scheduled.

Step 1: Pre-medicate the cat at home to reduce stress using
- Buprenorphine (0.03 mg/kg, oral transmucosal, 60 min before travel/arrival)
- Gabapentin (~10 mg/kg, PO, 60 min before travel/arrival)

The goal is to reduce stress with these medications; do not expect overt sedation. Transport cat in a clip top carrier and escort patient to QUIET, DARK room immediately upon arrival. Consider covering the carrier with towels that have been sprayed with Feliway.

Step 2: Low stress handling to achieve an IM injection.* Example: slip a towel between the top and bottom halves of the carrier so that the cat may be restrained under the towel for an IM injection. Choose one of the following options, combine medications in one syringe and administer IM.
- Hydromorphone (0.05 – 0.1 mg/kg) + dexmedetomidine (7 – 10 micrograms/kg)
- Butorphanol (0.2 – 0.4 mg/kg) + Midazolam (0.2 – 0.5 mg/kg) + Acepromazine (0.05 mg/kg)
- Can add Ketamine (1 – 2 mg/kg, IM, maximum 10 mg/cat) to either of these options to achieve heavier sedation, or as an additional IM injection if chemical restraint is inadequate after 15 minutes.

Allow 10 – 20 minutes before restraining in lateral recumbency for medial saphenous IV catheter (less stressful for the cat than cephalic catheter placement). If desired, a cephalic catheter can be placed after induction.

Step 3 – IV Induction: Pre-oxygenate and induce anesthesia with an IV induction agent. I prefer propofol +/- diazepam for induction because it is cleared more rapidly than ketamine. IV fluids and temperature support are important for these cats since that will help clear the medications and aid in preventing a prolonged recovery.

* In the unlikely event that safe IM injection is not possible, administer 1 ml of ketamine into the cat’s mouth using a tom-cat catheter. Be sure and rinse out the cat’s eyes afterwards (ketamine can cause corneal ulcers). Allow ~15 minutes before restraining for IM injection.

Recommended feline anesthesia resources