RABBIT ANESTHESIA AND ANALGESIA

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Rabbits are becoming an important component of small animal practice. An understanding of anesthesia and analgesia is essential, but an often frustrating area for the clinical management of these animals.

Although there is much information in the literature regarding rabbit anesthesia and analgesia, most comes from the use of these animals for research. The goals of research may not be the same as for single rabbit in a clinical setting. Hypothermia is more likely to occur in small mammals because of a large surface area/volume. Respiratory heat loss is also significant because of high ventilatory rates. Even apparently small blood loss can be significant; it is important to provide good hemostasis.

Monitoring includes assessing degree of unconsciousness, muscle relaxation and analgesia. The eye position is important for assessing anesthetic depth. The Doppler flow detector is very useful for monitoring blood flow and heart rate. Hypoventilation is common in rabbits. Pulse oximetry has been validated for use in rabbits; surprisingly the ears may not be the best sites for probe placement. Capnography, an indirect way of assessing P\textsubscript{a}CO\textsubscript{2} and ventilation, requires intubation.

Correct physical restraint is essential if lower spinal fractures are to be prevented. Distal tibia fractures are also common if a rabbit is dropped. Commercially available restraint devices facilitate handling, but care must be taken to avoid hyperthermia.

The quadriceps muscle is the preferred IM injection site because it is readily accessible, has a good blood supply allowing more rapid systemic absorption and is proximal on the leg. Pain due to peripheral injection of an irritant drug (e.g. ketamine HCl) can promote self-mutilation. Sites to attain vascular access include the cephalic, saphenous and peripheral ear veins, as well as intraosseous catheterization of either the humerus, femur or tibia. The auricular artery, the central vessel in the ear, should be avoided for catheterization for fluid administration. Damage to this vessel may result in thrombosis and ischemic necrosis of the distal tip of the ear. Intranasal, but
not oral mucosal, administration of some drugs (i.e. fentanyl, buprenorphine, midazolam) will result in rapid absorption.

Fasting is unnecessary in rabbits because they do not regurgitate or vomit, and it may predispose to perioperative ileus. Water can be provided until shortly before the induction. This author does not routinely use parasympatholytics. Many, but not all domestic rabbits possess circulating atropinesterases; it is not appropriate to increase the usual atropine dosage to compensate. Corneal ulceration is a common and significant issue for rabbits. The protruding eyes predispose to injury of the down eye. Further, once damaged the cornea can progress rapidly to perforation if not treated.

Most opioids are appropriate for analgesia in the perioperative period. This author prefers the partial agonist buprenorphine because of its duration of effect. Although opioids can affect gastrointestinal motility, so can pain cause ileus. NSAIDs are also a useful analgesic adjunct; meloxicam can be administered IM and PO. Tramadol is an additional drug that can be used to provide analgesia once the animal goes home. Epidural analgesia, using either morphine or local anesthetics, is an underutilized and validated form of analgesia.

The benzodiazepines (diazepam, midazolam) work well in rabbits and can be combined with either an opioid and/or ketamine for premedication and induction. Although well described for use in rabbits, this author generally avoids the alpha-2-adrenergic agonists (i.e. xylazine, detomidine, medetomidine, dexmedetomidine) because of concerns about hypoventilation, bradycardia and hypotension, especially with xylazine. The more selective agonists (i.e. medetomidine, dexmedetomidine) do, however, appear to be safer. After premedication this author prefers induction with isoflurane in oxygen. The animal is induced in a box, unless it is heavily premedicated and relaxed enough to allow mask induction.

Endotracheal intubation is an essential skill for rabbit clinicians to reduce anesthetic morbidity and mortality. The techniques can be divided into either direct visualization (endoscope, laryngoscope) or blind. Regardless of the technique used, correct positioning (i.e. hyperextension of the head relative to the neck) is necessary for aligning the oral cavity with the glottis and trachea. The V-gel system is an alternative to conventional Assessment of successful intubation includes a cough response, visualization of exhaled moist air and a normal pattern on the capnograph. Once intubated, care is taken to avoid placing the tube too far and obstructing one or more bronchi. This author also provides respiratory support during anesthesia.

Drug combinations used for darting of aggressive domestic carnivores.

**Cats**

Dexmedetomidine 30 ug/kg: ketamine 4 mg/kg
Xylazine 2 mg/kg: ketamine 8-10 mg/kg

**Dogs**

Dexmedetomidine 20-30 ug/kg: ketamine 3-4 mg/kg
Telazol 6-8 mg/kg
Medetomidine: Butorphanol: Midazolam

**Reference**