

Small Mammals

Common Surgical Procedures of Rodents, Ferrets, Hedgehogs, and Sugar Gliders



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KEYWORDS

- Rodent • Ferret • Hedgehog • Guinea pig • Chinchilla • Sugar glider • Surgery
- Anesthesia

KEY POINTS

- Surgical principles developed in dogs and cats can be directly applied to small mammals with some adaptations.
- Maintaining normal body temperature during prolonged procedures and minimizing blood loss are significantly more important in small mammals compared with dogs and cats.
- Key anatomic differences between small mammalian species must be known prior to performing any surgical procedure.
- Small mammal surgery requires knowledge of anesthetic techniques and application of appropriate analgesics.
- Common surgical procedures in small mammals include: integumentary mass and abscess excision, reproductive procedures (orchidectomy, ovariectomy, and ovariohysterectomy), gastrointestinal foreign body removal, prolapsed gastrointestinal tissues, urolith removal, and intra-abdominal mass excision.

INTRODUCTION

Developing skills associated with small mammal surgical procedures is important for clinical practice, whether in private/referral practice, a laboratory animal facility, or a zoologic institution. For quality veterinary care, it is important to understand not only anatomic and behavioral differences between species but also the most common clinical presentations for each small mammal species. This article describes common

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surgical techniques in rodents, ferrets, hedgehogs, and sugar gliders. Surgical procedures discussed in this article include integumentary mass and abscess removals, wound management, self-mutilation, management of prolapsed tissues, gastrointestinal and hepatic surgery, reproductive and urinary tract procedures, and endocrine diseases.

PRESURGICAL CONSIDERATIONS

Anesthesia and Analgesia

Anesthesia of small mammals, especially rodents, hedgehogs, and sugar gliders, can be challenging, and although this article is not intended to provide detailed information or protocols for small mammal anesthesia, it is, nevertheless, important to highlight a few important points. There are several premedication and sedation protocols available in the literature for small mammals, but intubation can be difficult for anesthesia maintenance in most small mammal species.^{1,2} The exception in this article is the ferret, which is easy to intubate, similar to intubating a small cat or kitten. Most rodent species and hedgehogs, however, require endoscopic intubation due to small oral cavities and obstructed view of the epiglottis.³ Without access to endoscopic intubation techniques, most clinicians default to using a small facemask for gas anesthetic induction and maintenance. Placement of an intravenous (IV) catheter benefits any animal undergoing a surgical procedure, and this is especially true in small mammals. IV or intraosseous access facilitates fluid administration for maintenance and replacement in the face of blood loss and provides rapid correction of cardiovascular perturbations by use of appropriate cardiopulmonary stimulant drugs.^{1,2} Small IV catheters (26 gauge to 23 gauge) can be placed in cephalic or saphenous veins of most small mammals and maintained during the procedure. IO catheters (eg, appropriately sized spinal needles or hypodermic needles) are most commonly placed in the proximal tibia or proximal femur. Appropriate anesthetic monitoring is critical during small mammal surgical procedures by use of a pulse oximeter, capnometer, ECG, and indirect blood pressure units. It is also important to monitor body temperature frequently, because low body temperature can cause markedly delayed, or lack of, postsurgical recovery. Use of circulating water heating pads, microwavable heating devices, or Bair Huggers (3M, Corporation, St. Paul, MN, USA) for maintaining patient warmth should be considered imperative. Pre-emptive analgesia, or analgesics administered prior to induction of a painful stimulus, is crucial in small mammals, although the literature is sparse with specifics with respect to analgesic efficacy, dosages, duration, frequency of administration, and safety.^{2,4-6} As with most nondomestic species, clinicians tend to extrapolate dosages from domestic mammals and hope there is some efficacy without detrimental side effects.

Surgical Preparation

Once an animal is appropriately anesthetized, maintained on monitors, provided supplemental warmth, and administered presurgical analgesics, and other medications, the hair around the surgical site can be clipped and the site aseptically prepared. Clippers and blades may need to be smaller than those typically used for dogs and cats, and some small mammals have delicate skin that is, easily traumatized by clippers. It is not uncommon for a surgeon to accidentally begin an incision with a clippers if not careful. Surgical site preparation is similar to dogs and cats, with chlorhexidine or povidone iodine-based soaps used for cleaning, and alcohol or warm saline used to wipe away excess soap. Excessive removal of hair and application of alcohol contributes to rapid loss in body temperature. It is best to use clear, plastic drapes so that the patient can be easily observed and monitored during the surgical procedure. Gas

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