

ANESTHESIA AND SURGERY IN FERRETS

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Ownership of pet ferrets in the United States has increased dramatically over the last 20 years. Their popularity is due in part to changing laws about the legality of ownership as well as their quirky and entertaining behavior. Many ferret owners are quite knowledgeable about the health, wellness and treatments available for their beloved fuzzies. They actively read, participate in discussion boards online and attend conferences. The online discussion boards are not just simple lay people, they also have participation from respected members of the veterinary and research community. The 3rd edition of *Ferrets, Rabbits and Rodents(also known as "The Pink Book")* by Katherine Quesenberry and James Carpenter, has a wealth of new treatment options and drug dosages from a variety of contributors. The popularity of ferrets as pets has also brought about in depth research into their anatomy and physiology to help answer questions such as why do so many ferrets develop adrenal disease or insulinoma. Adrenal disease and insulinoma are the two most common diseases ferrets are presented with. Research is unraveling the mysteries of why our furry friends are affected by these diseases but we are not at the finish line yet.

The small size of ferrets as patients brings about some challenges for anesthesia and surgery. Knowledge of their anatomy, physiology and disease processes is crucial. Ferret owners are often told to fast their pet 8-12 hours prior to surgery by an unknowing technician or receptionist. In a ferret with an insulinoma this could prove fatal. Knowing that it only takes 3-4 hours for a ferret to get food from food bowl to litter pan as well as the outcome of withholding food in a ferret with insulinoma can completely change the outcome of treatment.

Preoperative tests can be just as important for ferrets as they are for dogs and cats. Baseline information can be gathered from a complete blood count and pre-operative serum chemistries that at a minimum include glucose to screen for insulinoma. Radiographs and ultrasound may or may not be helpful depending on the disease process. Even with a skilled ultrasonographer, adrenal masses are not always visualized. Diagnostic imaging techniques can be helpful for gastrointestinal diseases such as a suspected foreign body and essential for cardiovascular diseases. Cardiac disease is commonly found in ferrets. Presenting signs may include those similar to other species but can often be difficult for owners to recognize due to the subtleness of the symptom or the similarity to a normal behavior. Coughing can be mistaken by an owner for the hairball type cough seen in cats or mild choking on kibble. Exercise intolerance can be mistaken for the routine ferret "speed bump" behavior. Anorexia and weight loss can be easily overlooked by an owner until the signs are severe and ascites mistaken for weight gain. Hind leg weakness and ataxia seem to present with almost any disease a ferret can get. Don't be fooled with this presentation by thinking it must be neurologic. It is common for ferrets to have multiple diseases at the same time, especially geriatric ferrets so review the patients history thoroughly.

Intravenous catheter placement and fluid support is critical for a positive anesthetic episode and recovery. Common sites for catheter place include the cephalic and lateral saphenous veins. Jugular catheters or central lines may be placed, but most times a cut down of the vein is required to facilitate placement. Pre-medication can make catheter placement easier or place the catheter immediately after induction and intubation. Having the ferret at least sedated in some manner lessens the chance of the patient struggling and blowing the vein

especially when there is so little vein to work with. Which vein you choose is really just a matter of personal preference, the size and condition of the patient. The same conditions influence the size of catheter you will place. Common peripheral, over the needle catheter sizes include 24 gauge or 22 gauge. An entry hole or incision through the skin can facilitate smooth placement due to a ferret's tough skin. Failure to follow this step often results in a burred catheter that will not feed into the vein. A 20 gauge needle, 18 gauge needle or a number 11 blade can be used. Keeping intravenous catheters patent (as well as IN your patient) post operatively can be a challenge. Over bandaging the catheter makes it big and bulky which can draw the ferret's attention to the limb leading to the ferret chewing out it's catheter. The other obstacle is the ferret's natural desire to burrow. Burrowing between layers of towels or the nice soft blankets provided with IV line in tow causes the entire IV and catheter to end up wound around blankets and pulled out of the patient.

Intubation is similar to cats both visually and with respect to the occurrence of laryngospasms. As with cats, a drop of lidocaine onto the vocal folds can help decrease the spasms. Successful intubation can usually be accomplished with a 3.0mm – 3.5 mm endotracheal tube. Once intubation is accomplished, the ferret can be maintained on Isoflurane or Sevoflurane.

Monitoring ferrets under anesthesia is similar to monitoring our dog and cat patients. Our monitoring equipment has evolved greatly over the past 15-20 years making multiparameter monitors or following more than just heart rate and SpO₂ readily available and understood by the technicians using them. Oscillometric blood pressure monitors can be difficult to use in these small patients, but a Doppler blood pressure probe can be taped to the foot and leg to provide monitoring options throughout surgery. Alligator style ECG clips can also prove to be difficult to use on ferrets. While their neck skin may be thick and tough, the thin axillary and inguinal skin can be damaged by the clips. One option is to pierce the area with a 25 gauge needle going completely through the skin and attach the ECG clip to the non-hub side. Respirations and quality of ventilation can be assessed with an end tidal CO₂ monitor. With all the potential dead space and possible resistance in these small animal anesthetic circuits, intermittent positive pressure ventilation (IVPP) may be needed and an ETCO₂ monitor will help determine the necessity for ventilator assistance. One of the biggest challenges during ferret anesthesia and surgery is maintaining adequate body temperature. As with all small patients, ferrets lose body heat by the simple act of clipping and prepping for surgery. Perioperative hypothermia increases with the open abdominal or thoracic cavities and exposure of internal organs. Warm air devices can help combat hypothermia, but some surgeons find it cumbersome to work with the added heat or blowing air near their small surgical field. Adhesive drapes such as Ioban[®] can assist in sealing off the surgical area from circulating warm air and keep the warmth next to the patient where you need it.

Attention to details in the post-operative period can also contribute to a positive or negative outcome for your patient. Hydration, warmth, pain control and nutrition are critical for these small patients. Be conscious of hypothermia in the post-operative period, but also remember that ferrets overheat easily as well and do not pant as dogs do. As soon as your patient will allow, try offering soft, bland food such as strained meat baby food or Hills A/D[®]. Ferrets that are not accustomed to soft food may require you to hand feed them or to gently wipe some onto their gums to start licking at the food. It is important to encourage your patient to start eating as soon as possible post op to minimize gastrointestinal stasis and support their rapid metabolism. Your best care and skill are *meaningless* to your patient if you do not address pain

control. With all the current information available to veterinary professionals it is unethical not to provide pain medication to our patients. Patients recover more quickly and with less complications when adequate pain medication is provided. Your patient will be more likely to eat and sleep post operatively if they are comfortable, making your job easier.

Knowledge and being prepared are the keys to success for any anesthetic or surgical procedure. Understand the disease process and potential complications especially for adrenal disease and insulinoma in ferrets. Realize a ferrets quirky behaviors, what is normal and abnormal for this species. If your practice sees exotic pets, take it upon yourself to learn all you can and continue your education to be the best technician you can be for these lovable characters.