

SEDATION INSTEAD OF GENERAL ANESTHESIA: PROCEDURES AND SURGERIES

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Sedation is an attractive option for exotic companion mammals when general anesthesia poses unacceptable risk. Newer drug alternatives, in combination with local or regional analgesia allow completion of minor diagnostic or treatment procedures without general anesthesia.

General anesthesia is commonly utilized in exotic pet medicine for procedures beyond surgery, such as for sample collection and radiography. General anesthesia is not without risk. A recent retrospective study of anesthetic death rates in the United Kingdom suggested anesthetic or sedation-related death rates in healthy patients of 0.05% for dogs, 0.11% for cats, and 0.73% in rabbits within 48 hours of the procedure. Death rate increased more than 10 times in patients considered sick prior to anesthesia. Comparison of anesthesia versus sedation, however demonstrated anesthetic death rate to be 2 to 2.5 times higher than sedation in all three species.

WHY SEDATE?

Sedation in general is a safer procedure than general anesthesia, and is often adequate for minor procedures such as phlebotomy, placement of a catheter, and diagnostic imaging. The addition of local analgesia reduces discomfort associated with painful procedures such as intraosseous catheterization.

Sedation becomes even more important in those patients for which anesthesia presents moderate to significant risk, in particular the ill or critical patient. General anesthesia involves risk, even under the best circumstances. The advent of safer inhalant agents was a boon to exotic animal medicine. However, inhalant agents are naturally hypotensive, and untoward effects are dose dependent. The use of inhalant agents as sole anesthetics necessitates higher doses; thus incurs higher risk. No other branch of veterinary medicine uses inhalants as sole agents for anesthesia for what are considered obvious risks. Therefore, exotic mammal practitioners should consider methods to reduce risk, which include the use of pre-anesthetic agents and analgesics to reduce the effective amounts of inhalant gases, and the use of sedation as an alternative to complete anesthesia when possible.

The following is a description of drugs currently used by the author and others for sedation of exotic companion mammals.

Midazolam. Midazolam is a benzodiazepine tranquilizer with sedation and anti-anxiety properties. Effects on blood pressure and other parameters are dose dependent, but relatively mild. Midazolam can be administered intravenously (IV) and intramuscularly (IM). Midazolam has anamnestic effects in human patients, which have also been demonstrated in rats. These effects could be expected to be of benefit in other

mammal patients as well.

Opioids. These agents are analgesic, but also provide sedation and work synergistically with midazolam. The effects of these drugs can be reversed with administration of naloxone. Choice of drug depends upon duration of effect desired and anticipated level of discomfort. In cases where an opioid is used solely to provide sedation along with midazolam, and discomfort is minimal, butorphanol is preferable due to short duration of action. Other longer-acting agents such as buprenorphine and hydromorphone can be considered when additional or longer-acting analgesia is required.

Ketamine. At low doses, ketamine is safe and can be an effective addition to midazolam and an opioid for the purpose of sedation. Ketamine also has analgesic effects at lower doses.

Etomidate. This drug is a sedative and hypnotic agent used for induction of general anesthesia. It is primarily used for human patients with compromised cardiopulmonary function due to minimal hemodynamic effects, when compared with other IV induction agents. The main drawbacks are the need for IV administration, and frequent muscle movements and possible seizure-like activity, which can be abated with pre-administration of benzodiazepenes such as midazolam. This drug has no analgesic effects.

Lidocaine/bupivacaine. Local infusion of these drugs facilitates procedures such as phlebotomy and catheterization. Local topical anesthetic gels, sprays and topical refrigerants are also useful.

Specific uses for sedation in an exotic practice are outlined below:

COLLECTION OF DIAGNOSTIC SAMPLES

While sedation alone does not allow collection of diagnostic samples from every patient, it is often sufficient. Even in those that ultimately require general anesthesia, sedation allows reduction of anesthetic agents according to the "multi-modal" effect. In the author's experience, the greatest benefit of sedation for collection of diagnostic samples is the use of low-dose agents (butorphanol and midazolam) in debilitated patients where sample collection is of prime importance for diagnosis and formulation of a treatment plan, but general anesthesia entails higher risk. Other specific examples include higher doses of the same agents, plus the addition of low-dose ketamine in clinically stable but fractious rabbits and small rodents. Dosages and drug combinations depend on anticipated level of discomfort and stress, and overall patient condition (Table 1).

PLACEMENT OF AN IV OR IO CATHETER:

Midazolam combined with butorphanol, when combined with local anesthesia over the catheterization site, is often adequate, especially in debilitated patients. Local anesthesia can be administered in the form of injectable lidocaine, or topical anesthetic products applied 10 minutes prior to catheterization. To use injectable lidocaine for IV catheterization, roll the skin over the vein laterally or medially, and infuse lidocaine into the subcutaneous and dermal tissue. Massage the area of infusion to diffuse the lidocaine bleb, which should now be directly over the vein. Wait 10 minutes

and place the catheter.

For in-hospital use to facilitate acceptance of an IV line or urinary catheter, midazolam in combination with butorphanol or buprenorphine often prevents disruption of IV or urinary catheters. Butorphanol can produce profound sedation in ferrets, and should be used at lower dosages (Table 1).

DIAGNOSTIC IMAGING

Ultrasound and radiography are often facilitated with a combination of midazolam and butorphanol, plus the addition of low-dose ketamine if needed, along with proper manual restraint. Proper radioprotection must be used when considering manual restraint for radiography in small exotic mammal patients. (It should also be noted that some states completely prohibit personal in the room during radiography.) This is accomplished with the use of radioprotective gloves and careful collimation of the primary beam over the area of interest excluding the restrainer's hands.

MINOR SURGERY

Procedures successfully accomplished with sedation and local analgesia include minor wound care, amputation of digits, replacement of rectal prolapse and purse string of mattress retention sutures, and biopsy and/or removal of smaller dermal masses. Investigations into further applications continue. Ability to perform this type of procedure depends in part upon the level of sedation, overall demeanor of the patient, and ability to

achieve successful local block. It is helpful to review local analgesic techniques for traditional pet species in order to improve analgesia in exotic pet species. Any procedure for which the patient appears to struggle excessively, or block is not achieved should be abandoned and general anesthesia employed. The advantage in these cases is that sedation and local anesthesia allow reduction of the level of general anesthetic required, which improves patient safety.

ACKNOWLEDGMENT

Reprinted in part from the Proceedings of the North American Veterinary Conference, 2009, 2010, and the Annual Conference of the Association of Exotic Mammal Veterinarians, 2010.

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Table 1. Drug Dosages Used by the Author for Sedation of Exotic Companion Mammals

Drug Class	Drug	Dosage (mg/kg)	Route	Comments
Benzodiazepine	Midazolam	0.25–0.50	IV, IM	
Opioids	Butorphanol	0.1-0.3	IV, IM	Short acting. This drug is very sedating in ferrets; consider lower doses
	Rabbit/Chinchilla/ Guinea pig	0.1-0.2		
	Ferret	0.5-1.0		
	Rat Mouse	1.0		
NMDA antagonist	Ketamine	1–10	IM	Used in addition to midazolam and an opioid for additional sedation
Sedative/Hypnotic agent	Etomidate	1–2	IV	Must use with benzodiazepine to prevent seizures. Short acting induction agent
Local anesthetic	Lidocaine	1–2 each	Local block or infusion	Enhances patient comfort for procedures such as phlebotomy and catheterization
	Bupivacaine			