

Anesthesia in whitetail deer

Shane Donley, DVM

Sugarcreek Veterinary Clinic Inc. Sugarcreek, OH 44681

Abstract

Anesthesia in whitetail deer can be very intimidating depending on your experience level. Your clients may have an extensive amount of field experience, but lack the knowledge to understand why certain protocols work better than others in certain situations. This discussion should provide you with a very practical over-view of anesthetic agents used commonly on deer farms. You will be able to help your clients know which agents to use when and why they would be the best choice.

Key words: deer, anesthesia, anesthetics

Résumé

Anesthesiologie au cerf de Virginie peut être très intimidant selon votre niveau d'expérience. Vos clients peuvent avoir une importante quantité d'expérience sur le terrain, mais ne possèdent pas les connaissances nécessaires pour comprendre pourquoi certains protocoles fonctionnent mieux que d'autres dans certaines situations. Cette discussion devrait vous fournir une vision globale très pratique des anesthésiques utilisés communément sur les fermes de cerfs. Vous serez en mesure d'aider vos clients à savoir quels agents d'utiliser quand et pourquoi ils serait le meilleur choix.

Using Anesthesia

Reasons for using anesthesia includes: semen collection; artificial insemination (both vaginal and laparoscopic); transport; surgery; embryo transfer; and testing procedures.

There are not many pharmaceuticals labeled for cervids, with the exception of xylazine. Be sure to work closely with your veterinarian, as this is required by law under the Animal Medicinal Drug Use Clarification Act. Extra Label Drug Usage is permitted only by or under the supervision of a veterinarian. ELDU is allowed only for FDA approved animal and human drugs. A valid Veterinarian/Client/Patient Relationship is a prerequisite for all ELDU. ELDU is therapeutic purposes only (animal's health is suffering or threatened), not drugs for production use. These rules apply to dosage form drugs and drugs administered in water. ELDU in the feed is prohibited. ELDU is not permitted if it results in a violative food residue or any residue which may present a risk to public health. FDA prohibits ELDU of:

- Chloramphenicol
- Clenbuterol
- Diethylstilbestrol (DES)

- Dimetridazole
- Iprnidazole
- Other nitroimidazoles
- Furazolidone, nitrofurazone, other nitrofurans
- Sulfonamide drugs in lactating dairy cattle, except approved use of sulfadimethoxine, sulfabromomethazine, and sulfaethoxyypyridazine
- Fluoroquinolones
- Glycopeptides (example: vancomycin)
- Phenybutazone in female dairy cattle 20 months of age or older

Be sure to seek professional education in wildlife anesthesia. There are two types of anesthetic agents:

- Neuromuscular blocking agents
- Central nervous system agents

Neuromuscular blocking disrupts communication between the nerves and muscles so the patient remains conscious, and still feels pain, but is paralyzed or unable to move. Over dosage or poor positioning, paralyzes diaphragm and can lead to suffocation. There is no antagonist or reversal. This is not the best choice for whitetail deer. It is better if they are unconscious in order to decrease the stress level. There's not much we do to whitetails that doesn't cause some pain, so look for something with analgesic properties. A common neuromuscular blocking agent is succinylcholine (Sucostryn®).

Central nervous system agents depress brain function in some way. This can range from mild sedation to complete loss of consciousness. Many have analgesic properties as well. The CNS drugs fall into three categories: 1) tranquilizers/sedatives, 2) opioids, and 3) cyclohexamines.

Tranquilizers available include acepromazine, azaperone, diazepam, xylazine, detomidine, medetomidine, and zolazepam.

These medications are considered sedatives. They do not produce complete anesthesia, but aids in muscle relaxation. Generally these are used in conjunction with an opioid or cyclohexamine. Most provide at least some analgesia and most are reversible.

Tranquilizer Reversal

Tranquilizers can be reversed with tolazoline (Tolazine®) or atipamezole (Antisedan®).

- Natural reversal occurs through adrenalin release of the patient. Sights and sound can lead to arousal (this is why we use masks.)
- Yohimbine does not work well in whitetail, blacktail or mule deer.

Opioids include carfentanil and butorphanol (Torbugesic®). They provide loss of consciousness and a good level of analgesia. They can be reversed by naltrexone.

Cyclohexamines include ketamine and tiletamine (Telazol®). Cyclohexamines provide loss of consciousness and some analgesia or pain relief. They have some amnesic ability and the patient maintains the ability to swallow and blink. This is usually combined with a tranquilizer or sedative. Telazol is a combination of tiletamine (a cyclohexamine) and zolazepam (a tranquilizer). Tolazine may aid in the reversal.

Inhalation anesthetics

- Isoflurane
- Sevoflurane
 - Need a good handling facility
 - Need a vaporizer
 - May want to intubate, especially for longer procedures (loss of swallowing reflex). Be sure to use the longer foal endotracheal tubes.
- Quick reversal
- Very safe

Combining injectable and inhalation anesthetics can work very well. There are several factors to consider when choosing an anesthetic protocol. What is the duration of the action, the safety and adverse effects, the cost, and availability? The practitioner should choose the safest and cheapest protocol that will last long enough to accomplish the task at hand.

Xylazine (Rompun® or Anesed®)

- Decreases heart function
- Decreases lung function
- Decreases gut motility
- Decreases thermoregulation
- Is a diuretic

Telazol®

- Duration of action 45-90 minutes
- Wide margin of safety
- Cost effective
- DEA schedule III controlled substance

Ketamine

- Duration of action 20 minutes
- Wide margin of safety
- Inexpensive
- DEA schedule III controlled substance

BAM combines several anesthetic agents and antagonists. It works well and is very reversible. It does not work well for semen collection. BAM is expensive, but is getting less so. It does not work on fallow deer.

BAM—patented combination butorphanol, azaperone, and medetomidine

Sedatives

- Acepromazine
- Azaperone
- Diazepam
- Xylazine

- Detomidine
 - Medetomidine
 - Zoladepam

Opioids

- Carfentanil
- Butorphanol

Cyclohexamine

- Ketamine
- Tiletamine

BAM Reversal

- Atipamazole (Antisedan)
 - Reverses medetomidine
- Naltrexone
 - Reverses butorphanol
- Tolazine (Tolazine)
 - Reverses medetomidine
 - (The azaperone is not reversed)

MK (Medetomidine/ketamine)

- Can get it compounded
- 5mg Med, 150mg Ket per mL (1mL/100#)
- Reverse with Atipamazole (20mg/100#)
- Precision Pharmacy

Be sure to lubricate the eyes with artificial tears or triple antibiotic eye ointment.

For laparoscopic insemination you need a fairly long duration especially if you are splitting the straws. Xylazine is a diuretic, so a large bladder is more risk to the surgery and/or difficulty visualizing the uterus. The surgery needs to be performed ASAP before the bladder enlarges. Vaginal insemination can be done in a drop chute. Some prefer anesthesia, but a large bladder is not as much of an issue.

Semen Collection

- Xylazine is a diuretic
- Urine kills semen
- Collect buck ASAP before buck urinates

Transport

- I prefer to transport deer awake
- Reduces chance of aspiration pneumonia and capture myopathy

Surgery

- May need local anesthetic for regional pain relief is using injectable anesthetics.
- IV fluids to prevent shock if blood loss is severe.

When it comes to timing, you will need to administer the meds via remote projection, pole syringe or hand injection. Leave the pen for the patient to relax. Remember, adrenaline is a natural reversal agent. Be sure to avoid stressing the patient prior to anesthesia. In 15 minutes, approach slowly to apply a mask. You may wait five additional minutes if needed. If you are unable to apply a mask within 15 minutes (maybe 20) you will need to give more meds. You can give xylazine/telazole or ketamine. If you wait too long to re-dose, you may lose the cumulative effect. I do not recommend giving just xylazine because of side effects.

Xylazine (Rompun® or Anesed®)

- Decreases heart function
- Decreases lung function
- Decreases gut motility
- Decreases thermoregulation
- Is a diuretic

Remember, Telazol is fairly safe. Xylazine has a lot of serious side effects. I prefer to hit them hard the first time so repeat dosing is not needed. If you repeat the dose, you increase the total amount of xylazine, which is more dangerous and more urine.

Reversal Debate—(Telazol/xylazine)

- Some prefer to reverse ASAP
- Some would rather wait until the dissociative drug is metabolized, then reverse the tranquilizer.

There can be complications of anesthesia. Why won't the patient go down? They could have too much adrenaline release, not enough dissociative drugs, delivery malfunction, too short of a needle or it was darted in the wrong location.

Positioning During Anesthesia—sternal position is by far the best and safest position for a deer to be in.

Capture Myopathy

- A complex metabolic condition brought on by prolonged physical exertion.
- Most commonly an animal that is restrained without adequate anesthesia.
- Using xylazine without a dissociative agent

Capture Myopathy Treatment

- Better to prevent than to treat
- Supportive care
 - IV fluids
 - Anti-inflammatories
 - Sodium Bicarb to correct lactic acidosis
 - Very poor prognosis

Hyperthermia

- High body temp (over 104)
- Very common in darted whitetails due to physical exertion

Hyperthermia Treatment

- Move out of direct sunlight
- Reverse ASAP. Standing animal is much more efficient at cooling itself
- Tube orally with cold water
- Cold water enema
- IV fluids

Hypothermia

- Body temp is too cold (less than 95)
- Keep animal dry if possible
- Cover animal
- Insulate underneath
- Warm water enema

Bloat is excess gas produced by fermentation of rumen contents. Using xylazine decreases gut motility leading to inability to eructate.

Bloat Treatment

- Keep patient in sternal position
- Do not feed prior to anesthesia (12-16 hours)
- Stomach tube to relieve gas
- Reverse xylazine

Pneumonia usually occurs two to four weeks post anesthesia. This is possibly due to the drop in white blood cell count. Aspiration due to poor positioning during anesthesia can also be a cause. Any handling or tranquilization causes stress leading to decreased immune function.