

CHEMICAL IMMOBILIZATION of WHITE TAIL DEER

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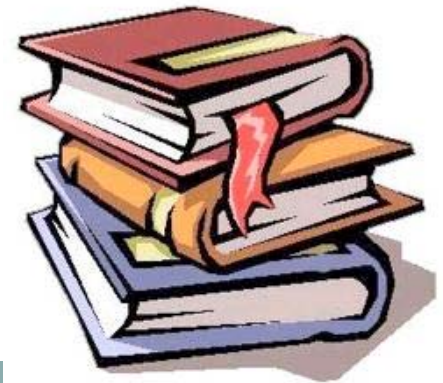
GOALS



- **Excellence** – if we do not demand it of ourselves, no one is going to make us.
- **Consistency** – same way each and every time, day after day, month after month.
- **Education** – “Knowledge is Power.”
- **Common Sense**

WORDS TO LIVE BY

- *Knowledge is power!*
- Knowledge is power!
- Knowledge is power!



CHEMICAL IMMOBILIZATION



REVIEW:

- **Sedation** = depression of the CNS but animal is still conscious and aware.
- **Anesthetic** = drugs that have the ability to alleviate the perception of pain. Causes loss of consciousness.
- Make your clients aware of the difference.

CHEMICAL IMMOBILIZATION



- **Reasons that a cervid may need to be anesthetized:**
 - Regulatory testing (TB and Brucellosis)
 - Semen collection
 - Artificial insemination
 - Antler Removal
 - Transport
 - Illness, injury ext.....

CHEMICAL IMMOBILIZATION



- **Objectives:**

- Minimal amount of stress to animal you are immobilizing.
- Minimal amount of pain to animal you are immobilizing.
- Least amount of risk to you, your team and the animal you are immobilizing.

STRESS IN WHITE TAIL DEER



- **Factors that cause stress:**
 - Unfamiliarity
 - Unnatural environment / situations
 - Unpredictability
- All of which can induce the **“Flight or fight Response”**
 - Keep in mind short term stressors vs prolonged stressors.
 - Effects it has on the immune system

STRESS IN WHITE TAIL DEER



- **An example of a prolonged stressor:**
- **SITUATION:** 30 bucks need to be darted so you can do regulatory TB and Brucellosis testing.
- **SCENARIO:**
 - Two guys with dart guns enter a pen and go into shooting blinds that the owner placed in the pen last evening.
 - Four other people enter the pen and try to keep the deer within shooting distance of the blinds.
 - The deer are now milling around and nervous

STRESS IN WHITE TAIL DEER



- Several of the deer try to move past the wall of people, but turn around at the last minute and run back toward the blinds.
- The shooters have taken several shots and are unsure if the other shooter knows what deer they have successfully darted. They begin to yell back and forth to communicate.

STRESS IN WHITE TAIL DEER



- The shooters only took in 20 darts apiece, thinking that five spare darts apiece was plenty.
- Now both shooters are out of darts and five bucks have yet to be darted.
- One shooter leaves the pen to get more darts.
- Once back at the barn he can not find the extra bottles of Telazole.

STRESS IN WHITE TAIL DEER



- He then sends a kid to run back into the pen and ask the owner where the extra bottles are.
- While this is happening a buck who has not yet been darted begins to charge and gore a buck who is under the effects of the drugs but has not yet laid down.
- The darts arrive and are brought back into the pen

STRESS IN WHITE TAIL DEER



- After several more misses the last five bucks have been darted.
- Now the vet and one person helping him begin to move amongst the down deer pulling blood and injecting the TB.
- No one is sure which deer were darted first or at what time they were darted.

STRESS IN WHITE TAIL DEER



- When the vet approaches the third deer it jumps up and runs away knocking over the tote containing all the vets supplies.
- The owner thinks the deer did not get the full dose and darts him again.
- Of the 30 deer darted 13 have to be re-sedated. Two of the re-sedated deer run head long into the fence at full speed.

STRESS IN WHITE TAIL DEER



- Several of the deer struggle to get away when the vet begins to work on them and several individuals sit on the deer to hold them down.
- The vet finally finishes and the owner begins to reverse the bucks.
 - Several of the buck get up and run away as the owner approaches them so he does not reverse them.

STRESS IN WHITE TAIL DEER



- The next day the owner calls the vet and is upset:
 - Two of his best bucks were found dead this morning.
- The rest of the bucks are walking around the pen stiff and most of them did not eat this morning.
- The owner is thinking his deer had a bad reaction to the vaccines you sold him.

STRESS IN WHITE TAIL DEER



- What went wrong?
 - No plan was in place
 - There were too many unfamiliar objects (blinds) and people in the pen on the day of testing.
 - Poor communication between the owner, the shooters, and the veterinarian.
 - The stress level placed on the deer by the owner, shooters and veterinarian was unacceptable.
- This is an example of a complete and total failure: Two bucks died and the rest are showing signs of Capture Myopathy.

STRESS IN WHITE TAIL DEER



- **An example of a short term stressor:**
- **SITUATION:** 30 bucks need to be darted so you can do regulatory TB and Brucellosis testing.
- **SCENARIO:**
 - Two weeks prior to the day of testing the owner places the shooting blinds in the pen.
 - Each evening for two weeks the owner walks into the pen carrying his dart gun and enters and exits the blinds several times.
 - The day of testing everyone who arrives to help stays at the house until told to move.

STRESS IN WHITE TAIL DEER



- The owner took the time to pull up all the drugs the day before, each deer has a labeled baggie containing everything they will receive that day.
- The owner and two shooters gather all their supplies, including extra darts and Telazole and head to the pen alone.
- The shooters each have a two-way radio, along with the owner and one is at the house.

STRESS IN WHITE TAIL DEER



- The owner and shooters silently enter the pen together. They all walk together to the first blind, one person enters, and the owner and second shooter move to the second blind.
- The shooter enters the blind and the owner walks out of the pen and back to the house.

STRESS IN WHITE TAIL DEER



- Nothing is done for the next 20 minutes, giving time for the deer to settle down and forget about the people who just entered the pen.
- Next, two people (called Pushers) with a radio enter the opposite end of the pen and separate at equal distances from each other and the sides of the pen.
- The owner is in place outside the pen where he can see but the deer are unaware of him.

STRESS IN WHITE TAIL DEER



- At the direction of the owner the two pushers in the pen move slowly forward until the deer move in range of the blinds and then stop.
- As the shooters begin darting they relate each deer darted to the owner and he records it with the time they were darted.

STRESS IN WHITE TAIL DEER



- The owner controls the pushers and the shooters, no one moves without his direction.
- If things do not go well, the owner will instruct the pushers to exit and allow the un-darted deer to escape.
- If all goes well, once the last buck goes down the owner waits ten minutes before releasing anyone from their positions.

STRESS IN WHITE TAIL DEER



- The pushers exit from the opposite end of the pen and the shooters from their closet exit.
- The owner and his assistant now enter the pen with an eye cover for each deer and at least 10 half doses of sedation/anesthesia.
- The owner should move to the deer who was darted first .

STRESS IN WHITE TAIL DEER



- The owner should drape the cover over the eyes and determine if the deer needs a half dose of anesthesia.
- If possible the deer should be placed in a sternal position with the head extended and the tongue pulled out of the corner of the mouth.

STRESS IN WHITE TAIL DEER



- The “monitoring team” should enter the pens and begin to take rectal temperatures and monitor respirations.
- Next the vet enters and begins to work. The deer should be at a plane of anesthesia where no assistance is necessary.
 - But for safety sake the vet should have an assistant place their hands on the head of each deer.

STRESS IN WHITE TAIL DEER



- Keep in mind the weather conditions: On a hot day the “monitoring team” should have a cooler full of ice packs, and on a cold day plenty of blankets.
- The “medication team” follows the vet and administers antibiotics, vaccines, vitamins, etc...
- Once the work has been completed the owner and his assistant should move through the pen reversing and removing eye covers.

STRESS IN WHITE TAIL DEER



- Once everyone is reversed only one person should stay close by to monitor the pen. Everyone else should go back to the house.
- If for some reason the owner can not get a dose of reverser into a buck, the owner should attempt to dart the buck with reverser after he lays down again.

STRESS IN WHITE TAIL DEER



- This scenario may sound unachievable.
- It's not!
- This can be achieved if you take the time to work with your client and with the supporting help.
- If you have one death or one case of Capture Myopathy you and the owner have failed.

STRESS IN WHITE TAIL DEER



- The most important thing we can do is keep one thought in mind:
NOT Here, NOT Now and NOT Today
- You can have a great plan and things still go wrong.
- If we stress deer too hard we will fail
- One person needs to be assigned the task of keeping the stress level of the deer in mind.

STRESS IN WHITE TAIL DEER



- This person should not be the owner, and should not be related to the owner.
- This person I call the “**Stress Master.**” He/She should be able to go to the owner and say:
 “We need to stop.”
- The owner needs to agree to listen to the “Stress Master” and see beyond the moment.
- If we all have to leave and come back another day it is a pain.

STRESS IN WHITE TAIL DEER



- No one is going to be happy about leaving, but if it prevents us from losing a deer, it is worth the aggravation.
- If the owner decides that the procedure must be done today regardless of the stress, then the team has failed and the potential consequences must be accepted.

STRESS IN WHITE TAIL DEER



- The deer should be handled in situations which are set up to be natural and familiar to them.
- The deer need to be trained and conditioned to the handling facility.

CHEMICAL IMMOBILIZATION



- Drugs used in the chemical immobilization of White Tail Deer:
 - Class III Drugs:
 - ✦ Telazole®
 - ✦ Ketamine®
 - Alpha₂ Adrenoreceptor Agonists:
 - ✦ Xylazine
 - Reversal Agents:
 - ✦ Yohimbine
 - ✦ Tolazine®
 - BAM



CHEMICAL IMMOBILIZATION



- **BAM:**
 - Acronym for:
 - ✦ Butorphanol (50mg/mL)
 - ✦ Azaperone (100mg/mL)
 - ✦ Medetomidine (40mg/mL)
 - Developed by ZooPharm (Wildlife Pharmaceuticals Inc).
 - Produces good analgesia with a wide species application.

CHEMICAL IMMOBILIZATION



- **BAM:**
 - Successfully used in White tail deer, mule deer, elk, bison, moose, pronghorn, bighorn sheep, waterbuck, and bear.
 - Does not work in fallow deer.
 - Administered through darting:
 - ✦ Most species can be darted with 1 or 2cc darts

CHEMICAL IMMOBILIZATION



- **BAM:**
 - Reversible:
 - ✦ Naltrexone (50-100mg per animal)
 - ✦ Atipamezole at a 3/1 ratio with Medetomidine or less
 - ✦ Tolazoline (1mg/kg)
 - ✦ ALL given IM separately
 - ✦ Some species have been reversed with just Naltrexone and Tolazoline.
 - ✦ Reversal to standing ranges from 1-5 minutes in most cases.
 - Cost- price has dramatically reduced over the past three years

SIDE EFFECTS OF SEDATION



- **Alpha₂ adrenoreceptor agonists** = potent CNS depressant which produce sedation but does not cause loss of consciousness.
 - Alpha₂ adrenoreceptor agonists block neural transmission in the brain and spinal cord by inhibiting the release of the neurotransmitter norepinephrine (Adrenaline) at the nerve ending.
- Establishes moderate pain relief
- Good muscle relaxation
- Effectiveness is directly related to level of excitement (Stress).

CHEMICAL IMMOBILIZATION



- **Alpha ₂ adrenoreceptor agonists:**
 - **Xylazine:**
 - ✦ Commercially available in a 100mg/mL concentration.
 - ✦ Often compounded in 200mg , 300mg and 400mg/mL concentrations.
 - Xylazine is often used as a synergistic adjunct drug with Ketamine, Telazole® and other opioids to improve immobilization quality.

SIDE EFFECTS OF SEDATION



- **Side effects of sedation using Alpha₂ adrenoreceptor agonists:**
 - Bradycardia
 - Secondary Heart Block
 - Hypotension
 - Decreased gut motility
 - Bloat
 - Hyperthermia

PEAK ANALGESIA



- Peak analgesia occurs at 15 minutes post injection and lasts 15-30 minutes.
 - ie: painful procedures should be done at the analgesic peak.
 - Sedative effects usually persist 1-2 hours or longer – this is not a reflection of analgesic effects.

REVERSAL AGENTS



- Alpha₂ Adrenoreceptor Agonist Reversal Agents:
 - Yobine® (Yohimbine) – 2 mg/mL
 - ✦ Effective in a variety of carnivores and hoofstock as a Xylazine antagonist.
 - ✦ Dose: 0.125 mg/kg IV or 0.25 mg/kg IM
 - ✦ Does NOT work well in cervids
 - Tolazine® (Tolazoline) – 100 mg/mL
 - ✦ Works well in cervids
 - ✦ Rapid and complete reversal of sedative effects within 2 minutes/ if given IV/ not recommended/ ER only
 - ✦ Deer is usually on feet and ambulatory within 10-15 minutes
 - ✦ Has been associated with transient apnea with jugular IV injections
 - Without Xylazine reversal thermoregulatory control may be impaired for up to 12 hours post immobilization.

REVERSAL AGENTS



- Side effects using Tolazine®:
 - Include but are not limited to:
 - ✦ Tachycardia
 - ✦ Sweating
 - ✦ Hyperalgesia
 - ✦ Eye and Nasal discharge
 - ✦ Muscle fasciculation
 - ✦ Apprehensiveness

CYCLOHEXAMINE AGENTS



- **CYCLOHEXAMINE AGENTS:**
 - Produce immobilization with “altered consciousness.”
 - Partial analgesia
 - Selective CNS depression
 - Causes minimal cardiovascular or respiratory depression.
 - Must be used in combination with adjunct drugs to prevent seizure activity, muscle rigidity, etc.
 - When used in combination with adjunct drugs this leads to a much smoother recovery and improved quality of anesthesia.

CYCLOHEXAMINE AGENTS



- **CYCLOHEXAMINE AGENTS:**
 - Ketaset® (Ketamine) – 100mg/mL
 - Telazole® (Tiletamine 286mg and Zolazepam 286mg) 572mg/vial.
 - ✦ Lasts approx 80 minutes in hoofstock
- **If used alone:**
 - Seizures - Excessive salivation
 - Muscle rigidity - Tachycardia
 - Tremors - Increased blood pressure
 - Vocalization

SIDE EFFECTS OF SEDATION



- Side effects using Telazole®:
 - Include but are not limited to:
 - ✦ Tachycardia
 - ✦ Seizures
 - ✦ Muscle Rigidity
 - ✦ Tremors
 - ✦ Vocalization
 - ✦ Excessive salivation
 - Hypertension
 - Rough ataxic recoveries
 - Central anoxia
 - Hyperthermia
 - Death

CHEMICAL IMMOBILIZATION



- **How to approach an immobilized deer:**
 - Slowly
 - Quietly
 - Outside of the visible range of the deer
- Any sign that the deer is still aware is a good indication that the deer needs more immobilization drugs before a full approach is made.
 - If approached too soon this could stimulate the “Fight or flight” response.
- **Re-dosing recommendations:**
 - Ketamine = 2.5 mg/kg IM
 - 50% of original mixture

CHEMICAL IMMOBILIZATION



- Most commonly used combination to immobilize White tail deer is Xylazine and Telazole®
 - Xylazine is cheap
 - Telazole® is expensive
- Farmers will try to save money by increasing the amount of Xylazine used.
 - This leads to poor anesthesia, increased stress and re-dosing.

CHEMICAL IMMOBILIZATION



- The more stressed the deer are when they are darted the more anesthetic drugs they will require.
 - Remind your clients that the more they train their deer the less expensive it will be in the long run.
 - Different farms will require variations in dosing regimes.

CHEMICAL IMMOBILIZATION



- What is an effective mix of Xylazine and Telazole® ?
 - 400 mg Xylazine (4cc's) mixed in one bottle of Telazole®.
 - Dose: 1cc of mixture /100 pounds of body weight
 - ✦ Yields out to be on average:
 - 2 Bucks per bottle
 - 4 Doe's per bottle
- This is my gold standard when darting deer.

CHEMICAL IMMOBILIZATION



- If the deer are trained to run through a shoot, a mix of:
 - 600 mg Xylazine / bottle of Telazole
 - 1cc of mixture /100 pounds of body weight
 - ✦ Yields out to be on average:
 - 3 Bucks per bottle
 - 5-6 Doe's per bottle

BAM



- With the price reduction the cost per dose is comparable to Xylazine/Telazole combination
- You the vet have to fill out a script for your client and send to ZooPharm
- You need to be compensated for you time and your responsibility
- **YOUR CLIENTS NEED TO HAVE THIS ON HAND!**
 - YOU WILL SAVE MORE DEER WHO ARE COMPRAMIZED IF YOU USE THIS TO PROVIDE ANESTHESIA

ANESTHETIC CONSIDERATIONS



- Once the deer are anesthetized it is important to remember to check for anesthetic depth.
 - This would include:
 - Blink Reflex
 - Pinnal Reflex
 - Tail tone
 - Jaw tone
 - Establish an open airway
 - Gum color / CRT
 - Temperature
 - Heart Rate / Respiration Rate
 - Deer should be placed in sternal recumbency
 - Allows both lungs to inflate / decreases incidence of bloat
 - Eyes should have a blindfold placed on them
 - Decreased visual stimulation
 - Pupils dilate from the anesthesia; preventative to decrease damage to retina by sunlight.

NORMAL VITALS

Temperature	101°F
Heart Rate	70-80/min
Respirations	16-20/min

CHEMICAL IMMOBILIZATION



- **Administering of Antibiotics:**
 - Always administer antibiotics anytime a deer is darted.
 - Why?
 - ✦ Because of the use of an injection method that is both non-sterile and rapid.
 - Primary defense against infection:
 - ✦ Is good wound care
 - ✦ Secondary systemic antibiotics
 - Recommend Broad spectrum AB

ANESTHETIC EMERGENCIES



- Anesthetic emergencies associated with chemical immobilization:
 - Respiratory distress / arrest
 - Cardiovascular shock / failure
 - Hyper / hypothermia
 - Aspiration Pneumonia
 - Capture Myopathy
 - Bloat
 - Seizures

ANESTHETIC EMERGENCIES



- **Respiratory distress / arrest**
 - Establish an airway
 - Dopram® (Doxapram HCL)
 - ✦ Dose: 0.5-1 mg/kg IV
 - Dexamethasone

ANESTHETIC EMERGENCIES



- **Cardiovascular shock / failure**
 - Fluids
 - Manual compressions
 - Solu-Delta-Cortef
 - ✦ Dose: 10 mg/kg IV
 - Sodium Bicarb in fluids
 - ✦ Dose : 4 mEq/kg
 - Epinephrine
 - ✦ Dose: 0.5 – 1mL IV
 - Atropine

ANESTHETIC EMERGENCIES



- **Capture Myopathy:**
 - Destruction of muscle fibers can be seen as early as 2 minutes from onset of a hard chase.
 - Common clinical signs:
 - ✦ Non recovery = shock / death
 - ✦ Sudden death 24-48 hours post event
 - ✦ Hindend lameness / weakness 2 days-3 weeks post event
 - ✦ Brownish urine = myoglobin present
 - Prevention:
 - ✦ Abort capture if deer is chased more than 2 minutes.
 - ✦ Re-schedule event no sooner than 24 hours.

ANESTHETIC EMERGENCIES



- **Hyperthermia**

- Causing Factors:

- ✦ High ambient temperature – especially direct exposure to sunlight
 - ✦ Stress
 - ✦ Lack of panting:
 - due to drug induced respiratory depression
 - Poor ventilation if in transport

- Supportive Treatment:

- ✦ Move deer to cool / shady area
 - ✦ Cold water enema
 - ✦ Cold IV Fluids
 - ✦ Spray down with alcohol
 - ✦ Ice packs

- Prevention:

- ✦ Avoid sedation on warm days
 - Schedule early morning or late evening
 - Avoid stress

ANESTHETIC EMERGENCIES



- **Hypothermia**

- Causing factors:

- ✦ Direct contact with cold elements
- ✦ Low ambient temperatures
- ✦ Animals in shock

- Supportive Treatment:

- ✦ Warm water enemas
- ✦ Blankets
- ✦ Water bottles / heating pads / heat lamps

- Prevention:

- ✦ Avoid direct contact with the elements
 - Use blankets if immobilizing on cold days
- ✦ Keep deer warm and dry
- ✦ Reverse deer when done

ANESTHETIC EMERGENCIES



- **Bloat:**

- Clinical Signs:

- ✦ Rapid shallow breathing
- ✦ Increased CRT time
- ✦ Abnormally distended abdomen

- Treatment:

- ✦ Place animal in lateral recumbency – head and neck extended
- ✦ Pass stomach tube

- Prevention:

- ✦ Proper positioning – sternal recumbency
- ✦ Avoid direct sun exposure
- ✦ Control food intake when possible prior to immobilization

ANESTHETIC EMERGENCIES



- **Capture and Immune resistance**

- At the University of Otago in New Zealand a study was conducted on the immune capabilities of physically captured Red deer by a mitogen response test:

- ✦ It was found that the immune response of these deer is Zero after capture and does not return to normal levels for approx. 40 days post capture.
- ✦ Thus there exists a window of susceptibility of infection and disease for up to 6 weeks post capture.

CHEMICAL IMMOBILIZATION SAFETY



- All drugs used for chemical immobilization are prescription or DEA scheduled drugs.
- All of these drugs must be obtained from or by the order of a licensed veterinarian.
- Remember you must have a valid client-patient relationship before dispensing any drugs.
- Require your client to keep a controlled drug log of all the drugs used.
 - This keeps you and the client safe.

WITHDRAW TIMES



- Most of the drugs used in deer medicine is “off label” use.
- Only 2 drugs have FDA approval for the use in White Tail Deer.
 - Anased®
 - Panacur®
- Since the use of most drugs is by “off label” use it is recommended that all drugs be labeled as such and have an established 30 day withhold time.

WITHDRAW TIMES



This is an example of one of the labels that our practice uses on all drugs dispensed for deer:

Black Horse Animal Hospital

P.O. Box 369 Gap, PA 17527

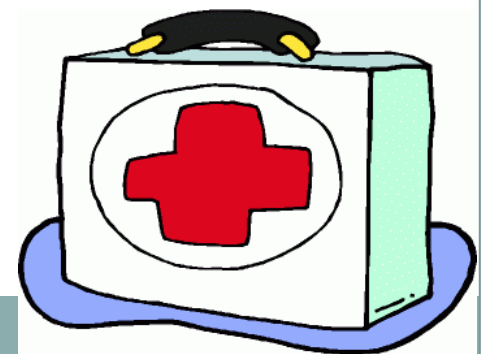
Willard L. Stoltzfus, VMD Douglas S. Wagner, DVM

This product does not have an established
meat withhold period for Whitetail Deer.

We recommend 30 days.

HUMAN SAFETY

- Have a protocol in place
- Have a well commutated plan in place
- Pay attention to what you are doing
- Wear gloves when darting
 - Treat every loaded dart like a loaded gun
- Let any medical personnel know what immobilizing agents are being used and antidotes if any.



REFERENCES:



- Amass, Keith D., DVM and Drew, Mark DVM. 2006 Chemical Immobilization of Animals Technical Field Notes : 2006

Thank you



QUESTIONS?

CONTACT INFO



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