DAVID HUNTER - CHEMICAL IMMOBILIZATION OF WILD SHEEP - HISTORY AND CAUTIONS

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Abstract: Immobilization of free-ranging bighorn sheep has long been an acceptable method of collaring, sampling and relocating animals. With adequate knowledge and training there are effective drugs and drug combinations that can be used to safely immobilize bighorn sheep. The most effective and safest agents for field immobilizations are the narcotic agents (Schedule II drugs). Many thousands of animals have been handled using these drugs from helicopters and ground darting operations. These drugs are extremely potent and human exposure to these drugs must be avoided. Special handling and safety precautions are mandatory. Other non-narcotic drug combinations have also been used successfully. During the post-capture (post-immobilization) event, critical care must be taken by the individual or team to assure a successful capture event. Immobilization drugs discussed will include: etorphine, carfentanil, ketamine, Telazol®, xylazine and valium. Reversal agents and other drugs include: naltrexone, yohimbine, antaginol, tolazoline and Dopram V®.

As one gets involved with bighorn sheep, there is one thing you must understand. Bighorn sheep are addicting. There is not a person here that doesn't love these animals. There is a lot of expertise in this room today. Any biologist starting a project on BHS should avail themselves of this published and unpublished treasure.

Immobilization of Bighorn sheep: The capture operation is more than just putting drug into the animal. I would suggest that any researcher working with BHS attend a restraint and handling course before you go into the field. There are several good courses throughout the nation. Veterinarians can not legally issue you drugs unless you are certified by a "drug course" for using these drugs. The biggest mistake people make in the field is under dosing the drug. There is nothing that will complicate an immobilization more that a half-drugged animal. This is true from the ground or from a helicopter. When you are in the process of immobilizing a BHS you must also be cognizant of your responsibility for the drugs you use and how you dispense them. As a point of fact, what is your responsibility if the animal you drug today is poached and consumed tomorrow? Your greatest resources are the people in this room that have had to answer these questions in the past.

There is nothing you can do legally that can replace good records. The excellent records biologists keep on the animals are a work of art. That is what you do the best. That same detail should easily transfer to the drug records that you must keep. The Drug Enforcement Agency and the Food and Drug Administration are not easy people to deal with should questions arise. Do not put yourself into a position that will put your careers or credibility on the line. **Keep Good Records.**

Succinylcholine: Over the years this drug has gained a bad reputation from veterinarians and biologists. This drug is a curare like drug that causes paralysis of the muscles. This is not a tranquilizer, analgesic or sedative. It only inactivates the animal by paralyzing the major muscle groups. Remember the dreams you had as children when you were being chased but could not run? That is the action of this drug. Is this more traumatic than being chased by a helicopter and having a human fire a net over your body and then running up and manhandling a BHS?

The other reason the drug has had a bad reputation is the narrow safety margin when used to immobilize an animal. In certain species the amount of drug need for immobilization is dangerously close to the amount that will kill the animal. Good animal management and understanding CPR can save these animals. Paralysis of the diaphragm is the reason for concern. If you can rescue breath the animal, the drug will metabolize and the animal will fully recover. The drug is quick acting and totally metabolized 20-25 minutes after darting. It could have a place in your drug kit only if you use it in the presence of a person who has successfully used the drug on the species before. Many biologists have used the drug for years without mortality, while others have lost most of the animals they have darted with succinylcholine. The drug is extremely safe for humans.

Diazepam or Valium: The most important factor to remember about Valium is that it is a potent anti-convulsant or anti-seizure drug. Valium can be used on BHS and is a mild tranquilizer. It is slowly absorbed when that given intramuscularly but has a long duration of action. When given intravenously, it must be given slowly. It can cause a problem if given in a bolus. It is a good drug to have in your drug kits. Valium can be used in conjunction with any other drug used for BHS immobilization. There is no need to reverse Valium when used as a tranquilizer.

Acepromazine: This tranquilizer has been used in wildlife for many decades. You will find doses for acepromazine listed in the literature in conjunction with most immobilization drugs. It is not reversible. It is an excellent tranquilizer. This drug will smooth out the harsh effects of other immobilization agents and can be used during transport of animals to curtail aggressive or destructive behaviors. It is a bottle you should have in your drug kits.

Xylazine (Rumpum), Detomidine and Medetomidine: These drugs are alpha-adrenergic agonists. The drugs work on a specific portion of the brain. They can be used as tranquilizers/sedatives in low doses and immobilization agents at higher doses. Xylazine is the weakest of the drugs and has been used for years in combination with ketamine, telazol and narcotics. This drug is reversible with yohimbine, tolazaline, and antagonil. The effect of having an alpha-adrenergic agonist with other narcotic and non-narcotic agents is that it does have analgesic properties. Therefore, procedures that produce pain require analgesia. You should all address the aspect of pain in your care and use protocols for handling animals. Used by themselves as immobilization agents can be unrewarding since adrenaline can override the drug. If the animals are stimulated they may jump up and continue to avoid capture. You must be careful in that if you do not find an animal that has had a large dose of xylazine, it may hide and, as the drug takes effect, the animal may place itself in a body position that will cause harm or death. These drugs are strong respiratory depressants and monitoring when using these agents is critical. Xylazine comes in two strengths; 20mg/ml and 100 mg/ml. Make sure you know the concentration when ordering this Xylazine.

Ketamine and Telazol: The drugs are non-narcotic disassociative analeptics. That is a term used to describe the effect of the drug on an animal. Many of the older biologists used phencyclidine as an immobilization agent in the past. Phencyclidine on the streets was called angel dust. Ketamine and Telazol are in the same category in their mode of action. These drugs keep the heart rate and respiration high so monitoring the animals is not as critical. These drugs are under a heavy scrutiny as having a potential for human abuse. Keep good records when using any drug. Ketamine and Telazol with Xylazine or Medetomidine can be used to immobilize any wildlife species in North America. Together they can produce a smooth immobilization and the alpha agaonists can be reversed.

Etorphine and Carfentanil: The narcotic drugs have a reputation for being extremely dangerous to use in the field. These drugs do require respect. That respect, and a good certification class, should give biologists the confidence to use these drugs. In the ungulate species narcotic drugs are the safest

drugs to use. They are completely reversible and the literature to draw on is immense. No one should be given these drugs to use in the field until they have successfully completed a certification course and is current on CPR. That should be mandatory for all state and federal biologists. Working in pairs with another person certified and current in CPR again should be a mandatory requirement.

Drug Doses: You should have a good reference guide. Calculating drug dosages, drug combinations, equipment to deliver the drugs, restraint equipment and emergency equipment and medications are areas that are covered in Terry Kreeger's book, "Handbook of Wildlife Chemical Immobilization". There are several other authors that have printed reference books.

Monitoring: Respiration, body temperature, heart rate, oxygenation and depth of immobilization are all areas that must be assessed frequently during a drugging event. Training in these areas should also be included in any certification class.

Euthanasia: Drugging events are an art form. Sometimes animals are critically injured and a biologist must address how to humanely euthanize the animal. There are several drugs on the market for this purpose. Many of these solutions can not be used unless the animal is removed from the wild. Residues from the euthanasia drugs can be deadly to carrion harvesters. That may include threatened or endangered bald eagles, condors, wolves, ferrets or bears. You must check the label before leaving a euthanized animal in the wild. The American Veterinary Medical Association has adopted guidelines for wildlife species.

Alternative Capture Methods: Net-gunning, drive netting, drop netting and corral trapping have all been used successfully for capturing BHS. They all have good and bad points. The stress on the sheep can produce bad results two to three weeks post capture. You should take responsibility for the animal you dart, relocate or otherwise handle for three weeks. If you have interfered with that animal's life, you may have predisposed that animal to disease or predation. There is a lot of expertise in this room. We are all here to assist you in your quest for handling BHS. Do not expect to become a BHS capture specialist by reading books and literature.

Conclusion: Be trained, keep good records, listen to your peers, and ask questions if you don't understand a protocol or procedure. Anyone in this room can put drug in a dart and potentially stick that dart in a BHS. The professionals know what to do for that animal to keep it alive after the dart is removed.

QUESTIONS, ANSWERS AND COMMENTS - DAVE HUNTER PRESENTATION

COREY HEATH, OREGON: You touched on it briefly, but with new drugs like telazol, xylazine, dexamethazone, and antibiotics, what is the recommended metabolism time period prior to human consumption? What will hold up in court and what won't?

DAVE HUNTER: Have we put together anything that talks about withdrawal times of drugs before humans can consume those drugs? Yes, we plagiarized some documentation out of Alaska. Terry Kreiger has copies and Idaho Fish and Game has copies, where we talk about withdrawal times. Basically, other than narcotics, we got it down to seven days. As far as drug companies, nobody will spend the money on withdrawal times. Seven days is what all the wildlife veterinarians use.

HEATH: That includes antibiotics?

HUNTER: It includes antibiotics, other than the long-acting penicillins and such. It's according to label. It might be 30 days with liquimiacin.