ANESTHESIA AND ANALGESIA FOR WILDLIFE – TIPS, TECHNIQUES AND DRUGS

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INTRODUCTION
One of the biggest challenges facing wildlife veterinarians is the lack of specific information with respect to the myriad of species that could be seen by your practice. Difficulty in administering anesthesia, analgesia, and the recognition of pain in these species are the main problems facing veterinarians. If you like cookbook dosages for every species you will have a hard time when working with wildlife. They key to success in anesthesia and analgesia in wildlife is being flexible and adapting to changes.

SPECIES IDENTIFICATION
Before determining drug dosages, a proper identification of the animal you are working with is essential. This may be a difficult task without a good set of field guides of native wildlife, including birds, reptiles, and mammals. Once an animal can be identified and its taxonomy recognized it may be easier to determine drug dosages for anesthesia and analgesia. Here is an example: you live in Colorado and a good Samaritan brings in a ground dwelling, grey and white, heavy body bird. You look in your field guide and identify the bird as a Grouse. This bird is in the family of Galliforms which include chickens, turkeys, quails and pheasants. From there you can determine that drug dosages published for chickens may be interchanged for the Grouse with similar effects. This may not always hold true and you may want to consult other books, rehabbers or wildlife veterinarians to find out the exceptions. This is the art of wildlife anesthesia.

PHYSICAL AND CHEMICAL RESTRAINT
Developing safe and effective physical restraint techniques for wildlife is a continually evolving art form. There are numerous ways to restrain animals and you must find a technique that you are comfortable with and works for your situation. Obviously, darting a deer out of a helicopter is exciting, but not always practical for most veterinarians. The gold standard for a successful restraint is to use the minimal amount of restraint needed to accomplish the goal safely, with the well being of the patient as the number one goal. With advances in anesthetic drugs in the last 20 years, it is probably safer and more humane to anesthetize a wild animal than to physically restrain it. There are numerous books dedicated to the restraint of wild animals. 1

Before any procedure involving physical restraint, a number of questions should be asked:
1. Is physical restraint necessary, and can the procedure be completed with physical restraint alone?
2. If physical restraint is used, will the animal and the handlers be safe?
3. Will the animal be in any pain during the procedure?
4. Do you have the appropriate facilities, equipment and personal to restrain the animal?
5. Just because you can restrain the animal does not mean you should restrain the animal (without anesthesia).

ADMINISTERING THE DRUG
In the case of wildlife, hand injection of anesthetic drugs may not be an option. Listed below are a few different options for drug administration.

1. Induction box
This is to be used in combination with inhalant gasses. The box can be as simple as a plastic box with a hole for the isoflurane administration. Or with very small animals a face mask, cat or dog size, can be utilized as an induction chamber. If the animal is in a small dog or cat carrier you can also use a clear garbage bag to place over the carrier and insert the isoflurane hose through a hole. The amount of waste anesthetic gas produced can be large. I always have an assistant remove the carrier and take it outside once the animal is removed from the carrier to be intubated or maintained on face mask.

2. Squeeze cage
This works well for larger animals. Of course, commercial cages that have a movable wall that restrains the animal are available; however it is possible to design your own. A large plastic garbage can can be utilized. You must first find a piece of plastic or metal grating that can be cut to fit into the mouth of the garbage can. You will also need to place many holes into the plastic board and add a handle. Then you can place the animal into the garbage can and use the grate to push down on to the top of the animal and then an IM injection can be given.

3. Remote injection
This is the glamorous part of the wildlife anesthesia. There are many companies that sell “dart guns”, however I suggest Dan inject (www.dan-inject-northamerica.com) and Pneu dart systems (www.wildpharm.com). These systems may work well, however they do take practice and can be costly to purchase. If you are not regularly immobilizing large wildlife this may not be a practical option. Blow dart is a second option to utilize. Blow dart systems are sold by the same companies listed above and besides being used on wildlife could also be used with aggressive dogs.

DRUG DOSAGES2 FOR WILDLIFE ANESTHESIA AND ANALGESIA

MAMMALS
• Squirrels, Small Rodents
  o Anesthesia - Isoflurane box induction, face mask
  o Analgesia
    ▪ Butorphanol 0.2 mg/kg IM bid-qid
    ▪ Meloxicam 0.1-0.2 mg/kg PO sid
    ▪ Ketoprofen 1-2 mg/kg IM bid
    ▪ Buprenorphine 0.05 mg/kg IM bid-tid

• Bobcat, Otter, Raccoon, Opossum, Fox, Skunk
  o Anesthesia
    ▪ Isoflurane box induction, facemask
    ▪ Medetomidine 0.03-0.05 mg/kg + Ketamine 3-5 mg/kg IM

• Reversal Atipamezole 5x Medetomidine dose IM
  ▪ Tiletamine/zolazepam 2-5 mg/kg IM (long recovery)
  o Analgesia
    ▪ Butorphanol 0.2 mg/kg IM bid-qid
    ▪ Meloxicam 0.1-0.2 mg/kg PO sid
    ▪ Ketoprofen 1-2 mg/kg IM bid
    ▪ Buprenorphine 0.005-0.01 mg/kg IM bid

Deer, Small Ruminant
  o Anesthesia
    ▪ Tiletamine/zolazepam 2-3 mg/kg + Xylazine 0.2-0.3 mg/kg IM
    ▪ Medetomidine 0.05 mg/kg IM + Ketamine 2-4 mg/kg IM
    ▪ Reversal Atipamezole 5x Medetomidine dose IM
  o Analgesia
    ▪ Butorphanol 0.2 mg/kg IM bid-qid
    ▪ Meloxicam 0.1-0.2 mg/kg PO sid (neonates)
    ▪ Ketoprofen 1-2 mg/kg IM bid
    ▪ Buprenorphine 0.005 mg/kg IM bid

Reptiles
  • Tortoises, Snakes, Box Turtles, Aquatic Turtles
    o Anesthesia
      ▪ Propofol 3-5 mg/kg IV
      ▪ Medetomidine 0.1 mg/kg + Ketamine 10 mg/kg IM
      ▪ Atipamezole 0.5 mg/kg IM
      ▪ Isoflurane via endotracheal tube
      ▪ Intubate – positive pressure ventilation 4 breath per minute (BPM)
      ▪ Switch to room air and ambu bag 10-20 min before recovery
    o Analgesia
      ▪ Butorphanol 1 mg/kg IM bid-qid
      ▪ Meloxicam 0.1 mg/kg PO sid
      ▪ Ketoprofen 1-2 mg/kg IM bid
      ▪ Buprenorphine 0.006 mg/kg IM bid

Birds
  • Raptors, Waterfowl, Passerines
    o Anesthesia
      ▪ Isoflurane face mask at 5% and intubate and maintain at 2-4%
    o Analgesia
      ▪ Butorphanol 1 mg/kg IM bid-qid
      ▪ Meloxicam 0.1 mg/kg PO sid
      ▪ Ketoprofen 1-2 mg/kg IM bid

Special Supplies
  Due to the numerous odd shapes of many wildlife species, veterinarians needs to be flexible and improvise equipment or manufacture your own equipment such as masks, induction boxes, gags, speculum, and slings.

Anesthetic Monitoring
  Typical patient monitoring includes temperature, pulse, respiration, mucous membrane color, pulse oximetry, Doppler flow, capnograph, ECG and blood pressure. As useful as these machines may be, the best anesthetic monitoring tools remain your eyes, ears and touch. I suggest purchasing a pediatric stethoscope, useful for small wildlife patients. Of course, in many situations, reduced anesthetic time is critical and this may limit your choice of monitoring devises. A few of my favorite monitoring devices are:

  Pulse Oximetry: works well to determine pulse and oxygenation trends over time. This technology has been developed for humans and not for animals. Pigmented skin or the use of Alpha-2 agonists drugs such as medetomidine may severely affect peripheral vascularization, reducing the pulse oximetry’s ability to measure oxygen saturation. Anatomy of certain species, such as reptiles, may also limit the use of pulse oximetry.

  Doppler Blood Flow: This is a great tool to utilize while completing surgery or anesthesia. By placing the probe over an area where blood vessels run you should be able to pick up a pulse. In some circumstances this may be the only way to detect a heart beat in a reptile. In many wildlife patients Doppler flow will allow the veterinarian to complete a surgery while hearing the heart rate.

  Working with wildlife can be a challenging and rewarding experience. Over time you will develop your own combinations drugs for anesthesia and techniques for handling animals. I encourage you to try different combinations as every clinician will develops there special combination of drugs. At the end of the day when you are able to liberate one of your patients back into the wild it makes everything worth while.

References