

AABP & AASRP Joint Sessions

Moderator: Jim Fallen

Field Anesthetic Techniques for Camelids

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Patient Evaluation

Administration of anesthetic agents to camelids is a source of anxiety for many veterinarians and owners. Llama and alpaca physiology is not a mainstream topic in most veterinary schools and, therefore, veterinarians do not feel comfortable in the administration of drugs routinely used in other livestock species. Although specific drug dosages differ between camelids and other livestock and even among llamas and alpacas, all other aspects of the “warm-blooded mammal” apply. The minimum data base before using an anesthetic is rectal temperature, heart rate and rhythm, respiratory rate and character, and general demeanor of the patient. If general anesthesia is planned, packed cell volume (PCV) and total protein (TP) should be determined. If the patient is geriatric (older than 10 years for llamas and alpacas), then more exhaustive diagnostic tests may be warranted (e.g. serum biochemistry). An accurate body weight will increase the safety of the procedure, but an estimation of body weight may be obtained by evaluating the body condition score.

Local Anesthesia

Local anesthetics are used sparingly in camelids. The most common indications are for suturing of wounds or other minor surgical procedures. Lidocaine 2% HCl is used most commonly. I have used lidocaine for intravenous regional anesthesia (IVRA) in llamas. IVRA's are administered intravenously distal to a tourniquet placed on the limb. Anesthesia generally lasts as long as the tourniquet is held in place, but rapidly dissipates after removal. Although the LD₅₀ dose of lidocaine has not been evaluated, toxicities have been reported. Therefore, I recommend diluting lidocaine to a 1% solution using isotonic bicarbonate or saline. Total dose should not exceed 2.0 mg/lb (4.4 mg/kg) body weight (1 mL of 2% lidocaine/2.3 lb [5 kg] body weight). Lidocaine toxicity is recognized by the onset of drowsiness, nystagmus, convulsions, and possibly death (LaRue Johnson, personal communication, 1998). The treatment of choice is diazepam (0.18 mg/lb or 0.4 mg/kg, IV).

Epidural Anesthesia

Epidural anesthesia may be used for analgesia of the perineum and tail. Lidocaine 2%, xylazine, or a combination of these may be used. Lidocaine (maximum dose 1 mL/110 lb [50 kg] body weight) alone is expected to provide two hours of analgesia. Xylazine (0.045 mg/lb or 0.1 mg/kg) alone is expected to provide three hours of analgesia. Xylazine + lidocaine combination is expected to provide six hours of analgesia. Epidural injection is made at the level of the most cranial palpably movable intervertebral space cranial to the base of the tail. The skin overlying this space is aseptically prepared. The needle is placed on dorsal midline with the bevel facing cranially and at a 60 degree angle to the tail head. The hub of the needle is filled with solution and advanced until the solution is seen to be pulled into the epidural space.

Sedation

The most commonly used drugs for sedation of llamas and alpacas are butorphanol, xylazine, and medetomidine. Butorphanol (0.045 mg/lb or 0.1 mg/kg, IV or IM) provides safe, reliable, and predictable sedation lasting approximately 20 minutes. Xylazine (0.14 mg/lb or 0.3 mg/kg, SC or IM; 0.091 mg/lb or 0.2 mg/kg, IV) provides more profound sedation and is less predictable, lasting 10 to 20 minutes with maximum sedation and an additional 10 to 20 minutes of mild sedation. Medetomidine (4.5 to 6.8 mg/lb or 10 to 15 µg/kg, IV) acts similarly to xylazine. In general, alpacas are more resistant to anesthetic drugs. I find that a 20% increase in dosage for alpacas over that used for llamas is not uncommon.

General Anesthesia

Many anesthetic combinations have been used for llamas and alpacas. For field anesthesia, I prefer to use a combination of butorphanol (0.045 mg/lb or 0.1 mg/kg, IV or IM), xylazine (0.091 mg/lb or 0.2 mg/kg, IV; 0.18 mg/lb or 0.4 mg/kg, IM), and ketamine (0.91 mg/lb or 2

mg/kg, IV; 1.8 mg/lb or 4 mg/kg, IM). This combination provides approximately 20 minutes of useful anesthesia for minor surgical procedures (e.g. castration). I recommend caution in the dosage of ketamine. I have seen profound respiratory depression after intravenous ketamine at 0.91 mg/lb (2 mg/kg). This reaction is not predictable, and I prefer to titrate the dose based on clinical response.

Patient Monitoring

Patient monitoring is critical during any period of sedation or general anesthesia. In my experience, respiratory rate is an easy and extremely useful parameter to measure to determine the status of the patient. Steady respirations are indicative of steady state sedation or anesthesia, infrequent shallow respirations indicate that the patient may be too deeply anesthetized, and rapid respirations indicate recovery from the effect of the drugs.

Selective Antagonists

If the patient is determined to be too deeply anesthetized or immediate recovery is desired, selective antagonist or general stimulant drugs may be administered. Yohimbine (0.045 mg/lb or 0.1 mg/kg, IV) is the reversal drug of choice for llamas and alpacas. This drug is safe and effective. However, caution must be observed in reversing camelids under the effects of several drugs, such as xylazine + ketamine, because the other drugs will not be antagonized. Tolazoline is a selective antagonist for xylazine, but has been associated with adverse reactions and deaths (possibly caused by profound hypotension). This drug is not recommended for use in camelids. Atipamezole (0.045 mg/lb or 0.1 mg/kg, IV) has been used in camelids, but I have witnessed several failures to reverse medetomidine sedation; one alpaca actually became more sedated!