

Injectable anesthesia for cattle field procedures

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Introduction

For ambulatory veterinary practitioners, the need to safely perform field-based procedures is paramount. The purpose of this presentation is to discuss use of injectable anesthesia to aid in the veterinary practitioner's ability to perform an array of tasks ranging from routine to invasive procedures. Multiple drug protocols will be outlined from the perspective of the author/presenter and case-indications will be described.

General considerations

The choice to use conscious or heavy sedation or general anesthesia should be considered carefully. No sedation is fully without risk, and the veterinary practitioner should be aware of challenges that can arise with the use of injectable anesthesia. This includes discussing said risks with the producer prior to anesthesia administration.

The amount and type of sedatives or anesthetics to be administered will depend on the procedure to be performed, the animal's temperament, and facilities available. Less is always more with injectable anesthesia. Practitioners should use lidocaine or other local anesthetics to minimize painful stimuli at the procedure site, resulting in lessening the amount of sedative needed to maintain the animal at a comfortable level of sedation or general anesthesia. Common local and regional blocks have been recently reviewed.¹ Decreasing external stimuli in the form of noise or even covering the eyes can aid in sedation especially in prey animals already on high alert.

Prior to sedation or anesthesia, a physical examination should be performed, with special attention to cardiac rate and rhythm. In the field, intubation and intravenous catheter placement is not commonly performed with injectable anesthesia. This emphasizes the need to know the health status of the animal prior to sedation. With the administration of sedatives and anesthetics, just seconds on the clock cardiovascular and respiratory depression can occur. Ruminants come with additional challenges due to the size and gas production within the rumen. Fasting ruminants for 24 hours prior to anesthesia can minimize the extra pressure placed on their cardiovascular and respiratory systems. When positioning the animal under heavy, recumbent sedation or general anesthesia, saliva drainage and eye protection should be considered. While in lateral recumbency, the animal should be well padded with the ventral limb brought forward to minimize neuropathy from prolonged recumbency.

Standing or conscious sedation

The use of sedatives to "take the edge off" to allow the safe and efficient performance of a procedure is helpful in many field settings. Multiple protocols using a single drug or combinations have been recently reviewed.² These proceedings are by no means all inclusive as the author/presenter has chosen to focus on common protocols used in their practice. Indications

for the use of standing, conscious sedation widely vary but include any procedure that requires the animal to stay standing perform the procedure. The use of alpha-2 agonist drugs such as xylazine seems to be the mainstay for farm animal anesthesia. Xylazine is currently cheap, and widely available but it is important to remember that ruminants are sensitive to the drugs effects. Xylazine doses of 0.025 mg/kg IV, 0.05mg/kg IM or detomidine 0.01 mg/kg IV, 0.04 mg/kg IM can provide standing sedation, however the animal will respond to stimuli. If the effect of sedation is not enough for the practitioner's need, adding an additional drug such as acepromazine may help create better sedation. Due to ruminants' sensitivity, the practitioner should be cautioned against increasing the dose of xylazine alone as a higher dose can result in recumbency. The combination of multiple drugs allows the practitioner to administer a small amount of medications and yet results in more sustained standing sedation. Ket-stun protocol combines butorphanol, xylazine and ketamine to create such an effect. There are many doses published with the most common administration including butorphanol 0.01 mg/kg, xylazine 0.02 mg/kg, ketamine 0.05 mg/kg given IV for approximately 10 minutes of standing sedation. Intramuscular doses increasing the ketamine dose to 0.1mg/kg increases the duration of sedation to 20 minutes. Administering 25-50% of the initial dose incrementally can help maintain sedation for prolonged periods of time if needed.

Heavy sedation to general anesthesia

Deep sedation resulting in full recumbency of the patient may be required for painful or invasive procedures. Further, this amount of anesthesia may be needed to perform routine care such as castration or foot trims when facilities are limited or unavailable. It is important to remember that large ruminants should not remain recumbent for more than 60 minutes due to multiple adverse events that can occur. Multiple protocols using a single drug or combinations have been recently reviewed.²

As mentioned above, increasing the dose of xylazine (0.05-0.1 mg IV or IM) can result in recumbency. These animals may still respond to noxious, painful stimuli. Drug combination can result in less medication administration and more well-rounded sedation or general anesthesia. Ketamine, xylazine and butorphanol can be used in combination for a variety of ruminants including camelids. A stock solution can be created in a 10:1:1 by volume ratio by adding 1 mL of 100mg/mL xylazine and 1 mL butorphanol (10mg/mL) to a 10 mL vial of ketamine (100 mg/mL). True ruminants can receive 1mL/80-100lb IM for 30-45 minutes of heavy sedation. Alpacas (1mL/40lb IM) and llamas (1 mL/50lb IM) are less sensitive to the effects of xylazine and receive a higher dose. Alternatively, 25% of the IM dose can be administered IV for 15 mins of heavy sedation. Telazol can be combined with xylazine to result in heavy sedation. Telazol reconstituted with 500 mg of xylazine can be administered at 3-5 mL to an adult bovid to result in 45 minutes of heavy sedation and recumbency. Unfortunately, the cost of telazol makes this protocol less attractive.

Neonates

Heavy sedation should be used with caution in neonatal ruminants. Neonates have a different metabolism compared to adult ruminants, resulting in an increased risk in cardiovascular, respiratory and temperature changes associated with anesthesia. Milk should not be withheld from neonates due to the risk of severe hypoglycemia. Administration of midazolam or diazepam may be adequate to perform a quick and minimally painful procedure without major risk of cardiovascular compromise. Furthermore, the thoracic squeeze method initially described in foals has been utilized in beef calves to result in temporary manual recumbency.³

References

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