Anesthesia of Donkeys and Mules: How They Differ from Horses

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Although it is tempting to assume that donkeys and mules can be handled, restrained, and anesthetized in the same manner as horses, this will usually result in unsatisfactory results. Underlying differences in physiology lead to pharmacokinetic and pharmacodynamic differences that alter the responses to most therapeutic agents used. The equine practitioner must be knowledgeable about these equine species or call himself merely a horse practitioner. Authors' address: The Texas Veterinary Medical Center, Texas A& M University, College Station, TX 77843-4474. © 2002 AAEP.

1. Introduction

The purpose of this review paper will not be to provide an exhaustive review of all the methods for anesthetizing donkeys and mules but will be an overview of some of the ways they differ from horses.

Behavioral and anatomic differences have been well covered elsewhere.[1–3] The first warning a practitioner has is that donkeys and mules don't look like horses! They don't act exactly like horses either (which is why they have been given the reputation of being stubborn). In many ways, they are more like cattle: stoic about not showing distress and pain and easier to restrain with hobbles or ropes, if securely applied. Many procedures could probably be performed in donkeys with sedation and appropriate use of local anesthesia as is common in cattle. It is, however, a major mistake to underestimate their intelligence; they are very capable of fighting effectively when not out-numbered, and they are very canny about recognizing when they are.

2. Physiologic and Pharmacologic Differences

These have also been extensively covered elsewhere,[1] although there is still much research which could be done. The donkey seems to be desert-adapted; therefore, fluid-balance mechanisms are different than in the horse.[4] It also seems that the donkey may have a greater capacity to metabolize certain drugs.[5–10] The sum of these two seems to be that donkeys will often require more drug or at shorter intervals to maintain effective drug concentrations. This seems to be especially true for miniature donkeys. However, in the case of certain anesthetic adjuncts (guaifenesin), donkeys seem to be more sensitive to the depressant effects.[11] It seems to be much easier to produce respiratory arrest with guaifenesin in donkeys than in horses. Where studies have been done, mules seem to be either the intermediate between donkeys and horses or closer to the horse in their responses to drugs. There is probably more variation in mules because of the large variability of the horse parent; we wouldn't expect a racing mule to have similar drug responses to a draft mule.

NOTES

3. Injectable Anesthesia

This has also been well-covered elsewhere.[12–14] In brief, donkeys can be anesthetized for short periods of time with horse doses of xylazine/ketamine, with the exception of miniature donkeys. Miniature donkeys (less than 33 in at the withers) have become fairly popular as pets; they are often owned by non–horse-owning clients who are not aware of the safety concerns generally understood by horse owners. Miniature donkeys are best anesthetized with xylazine (1.1 mg/kg, IV) and butorphanol (0.04 mg/kg, IV), followed by tiletamine-zolazepam (Telazol; 1.0 mg/kg, IV). If tiletamine-zolazepam is not available, miniature donkeys can be anesthetized with xylazine (0.4 mg/kg, IV) followed by propofol (2.0 mg/kg, IV). Additional propofol (0.2 mg/kg/min, IV) can be used to maintain anesthesia. Mules require 50% more xylazine (1.6 mg/kg, IV) to produce adequate sedation before ketamine administration, and duration of the anesthesia will be shorter than in the horse.

How tame (or how wild) is the animal is an important point to consider when deciding on drug combinations and dosage. Tame standard donkeys respond well to horse doses of xylazine and ketamine, although they seem to metabolize ketamine more rapidly. However, feral or untrained donkeys, which must be wrestled at each step of treatment, will require higher doses of sedatives and tranquilizers. In my experience, this is also true for horses. If sedatives must be given by the intramuscular route, instead of intravenously, the dose should be doubled.

The combination of xylazine-ketamine-guaifenesin, commonly referred to as "triple drip" can be used in donkeys, with some modifications. We use 1 l of 5% guaifenesin mixed with 500 mg xylazine and 2000 mg ketamine. After pre-medication with xylazine, 1.0 mg/kg, IV, anesthesia is induced with rapid administration (free flow) of the mix. When recumbency occurs (generally in 1–2 min), the rate is adjusted to approximately 2.2 ml/kg/hr of anesthesia. This seems to provide good anesthesia for procedures such as cryptorchid castration, umbilical hernia, etc.

4. Inhalant Anesthesia

In our experience, donkeys and mules seem to respond to inhalant anesthesia in the same way as horses. We have not noticed that higher or lower vaporizer settings are needed,[1] although this will vary with the procedure, length of anesthesia, and pre-existing condition of the animal. Because of the more tractable nature of donkeys, mask induction could be more easily performed on larger, older animals than would typically be done to horses. We have mask-induced adult donkeys with no great difficulty or danger to either the animal or personnel. Naso-tracheal intubation is limited by their smaller nares and nasal passages; we do not use this technique in donkeys.

5. Monitoring and Support

Depth of anesthesia should be monitored in the same manner as for horses. Careful observation of changes in respiration (depth as well as rate) and eye reflexes are necessary to maintain appropriate depth of anesthesia. Again, donkeys are more stoic and don't show these differences as much as horses. Blood pressure is a more sensitive method for detecting changes in anesthetic depth. Support measures (e.g., fluids, padding) should be the same as for horses.

6. Recovery

The quality of recovery from anesthesia is almost always good in donkeys, unless there has been no provision for analgesia or other major problems occur (i.e., seizures, respiratory difficulty). Because of their quiet, stoic nature, it is not usually necessary to sedate them for recovery, but it is likely that recovery will be somewhat longer than what is expected for a similar procedure in the horse. Generally, donkeys will remain in sternal recumbency until they are quite able to stand unassisted. In some instances, they may need (and will tolerate) a "boost" on the tail. Donkeys may also achieve standing like a cow; hind-end first rather than front-end first like a horse. Our usual procedure is to simply leave donkeys unattended (although not unobserved) in recovery. Mules seem to be more horse-like in recovery; sedation and assistance may be necessary depending on the underlying temperament and degree of training of the mule.

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