How to Anesthetize Donkeys for Surgical Procedures in the Field

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1. Introduction
Donkeys are an important part of the work force in much of the world. Practitioners working with donkeys in the United States and those participating in equitarian initiatives abroad should understand the difference between donkeys and horses in relation to anesthesia. Although it is tempting to treat a donkey like a horse, there are important differences in relation to handling and drug doses. Additionally, it is important to understand alternative anesthetic protocols because a practitioner may be limited to minimal or alternative drugs when working in a developing country.

2. Behavior and Physiology
A tame donkey can be easy to handle but a feral or minimally handled donkey can be frustrating. Donkeys are intelligent and typically take little time and handling to tame and train. They tend to lean into pressure and lean against a pulling force; therefore, the best technique for moving a donkey is gentle coercion. Anatomic and physiologic differences make intravenous injection, orotracheal intubation, and drug dosing more complicated. The cutaneous colli muscle extends over the jugular furrow and can hinder visibility when distending the vein, complicating venepuncture or catheter placement. Placing a local block where a catheter will be placed and making a small skin incision with a surgical blade before placing an intravenous catheter is recommended. Intubation is more difficult because of caudal angulation of the larynx, a pharyngeal diverticulum, excess pharyngeal mucosa, and long paired laryngeal sacules. Additionally, nasal intubation is complicated by narrow nasal passages.

3. Sedation and Analgesia
Xylazine, romifidine, detomidine, and dexmedetomidine have been safely administered to donkeys using doses similar to those administered to horses with sedation and analgesia of duration shorter than or similar to that in horses. Personality and demeanor should dictate which part of the dose range you select when determining a protocol (Table 1). If intramuscular dosing is required, it is recommended to double the intravenous dose for a similar effect. In a calm, tame donkey, xylazine can be

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dosed at 0.8 mg/kg (range, 0.3–1 mg/kg) IV or romifidine administered at 0.08 mg/kg (range, 0.05–0.1 mg/kg) IV. Detomidine can be given at 0.01 mg/kg (range, 0.005–0.04 mg/kg) IV, and dexmedetomidine can be dosed at 0.005 mg/kg (0.0025–0.01 mg/kg) IV, with sedation lasting 20–30 min. Acepromazine can be administered with an α-2 agonist if the donkey is agitated or anxious at 0.03 mg/kg (range, 0.02–0.05 mg/kg) IV or IM. Adding butorphanol to an α-2 agonist produces superior sedation and analgesia at a dose of 0.03 mg/kg (range, 0.02–0.05 mg/kg) IV or IM. Buprenorphine can be administered at 0.006 mg/kg IV, IM, or sublingual. This drug does not produce sedation when given alone and can result in excitement if given to a donkey without an α-2 agonist. From observation, the analgesia associated with buprenorphine lasts ~6 h. Morphine should be administered at 2.5 mg/kg and is more effective when combined with diazepam or midazolam at 0.05 mg/kg (range, 0.02–0.08 mg/kg) IV. Propofol produces smooth induction and recovery with anesthesia that lasts ~10–15 min when administered at 2.0 mg/kg IV. Thiopental administered at 8.0 mg/kg IV produces anesthesia that lasts ~20 min with slow recovery. Alfaxalone, a drug that is currently not approved for use in the United States but is approved in Europe and Australia, can be administered at 2.0 mg/kg IV, with anesthesia lasting 10–15 min. From experience, recovery from alfaxalone in donkeys is slow, with muscle fasciculations and weakness. Miniature donkeys are similar to standard donkeys, although telazol (the combination of tiletamine and zolazepam) has been used with success and is recommended for induction at 1.0 mg/kg IV. The duration of anesthesia using any of these anesthetic protocols can be extended by 3–5 min with an additional IV bolus of the induction agent at one third the initial dose. It is important to protect the donkey’s eyes while anesthetized. Most induction techniques maintain a blink reflex, but it is not always adequate to prevent ulceration of the cornea. Sterile ophthalmic lubricant should be applied to the eyes and a towel should be placed under the down eye to prevent contamination with grass, soil, or shavings.

4. Induction

Induction agents that are used in horses can be used in donkeys at similar doses. Dosing of ketamine should be administered at 2.5 mg/kg and is more effective when combined with diazepam or midazolam at 0.05 mg/kg (range, 0.02–0.08 mg/kg) IV. Propofol produces smooth induction and recovery with anesthesia that lasts ~10–15 min when administered at 2.0 mg/kg IV. Thiopental administered at 8.0 mg/kg IV produces anesthesia that lasts ~20 min with slow recovery. Alfaxalone, a drug that is currently not approved for use in the United States but is approved in Europe and Australia, can be administered at 2.0 mg/kg IV, with anesthesia lasting 10–15 min. From experience, recovery from alfaxalone in donkeys is slow, with muscle fasciculations and weakness. Miniature donkeys are similar to standard donkeys, although telazol (the combination of tiletamine and zolazepam) has been used with success and is recommended for induction at 1.0 mg/kg IV. The duration of anesthesia using any of these anesthetic protocols can be extended by 3–5 min with an additional IV bolus of the induction agent at one third the initial dose. It is important to protect the donkey’s eyes while anesthetized. Most induction techniques maintain a blink reflex, but it is not always adequate to prevent ulceration of the cornea. Sterile ophthalmic lubricant should be applied to the eyes and a towel should be placed under the down eye to prevent contamination with grass, soil, or shavings.

5. Maintenance

The combination of guaifenesin, ketamine, and xylazine, known as “triple drip,” can be used as main-
tenance anesthesia for donkeys. Because of sensitivity to guaifenesin, a solution of 12.5 g guaifenesin, 500 mg ketamine, and 250 mg xylazine in a 500-ml bag of saline or lactated Ringer’s solution (LRS) is recommended. This combination can be administered after induction at 1 drop/s initially and then given to effect as depth of anesthesia changes. This combination will last for a minor surgical procedure that takes ~45 min. A fast bolus of this combination will result in apnea, and therefore, caution should be used during administration. If a portable foal or small animal anesthetic machine is available, miniature and standard donkeys can be intubated and maintained on isoflurane® or sevoflurane® using anesthetic concentrations similar to horses.

Intubation is more complicated than in horses but can be achieved by extending the head in a straight line along the dorsal surface of the donkey. A bite-block (typically PCV piping) can be placed between the incisors, with the endotracheal tube placed through the block to the point of resistance at the larynx. Advancing the tube with gentle manipulation during inhalation will often result in intubation. If there is resistance, retract the tube to the oral cavity, rotate 180°, and try again.

6. Recovery
Donkeys typically recover from anesthesia in a calm manner, rolling into sternal until they are alert and capable of standing on the first attempt. Most donkeys will recover unassisted without complication, but they can be assisted in recovery if necessary. Because of small size, they are relatively easy to restrain in a lateral position by placing a knee or both knees on the dorsal neck and pulling their head toward you to prevent the momentum needed to stand. Grabbing the tail for assistance and giving it a boost when they do attempt to stand is tolerated and effective as they tend to stand front end first.

7. Results
These techniques have been used with success in ~500 anesthetic cases per year run by veterinary students in a university setting. All protocols and procedures were approved by an Institutional Animal Care and Use Committee.

8. Discussion
Donkeys can be easy to work with if you understand their personality traits and recognize that they are not horses in their responses to handling and drug metabolism. Pre-medication dosed appropriate for temperament will result in sedation for standing procedures and induction of anesthesia. Induction produces anesthesia lasting between 10 and 20 min with a variety of anesthetic agents used for horses or agents commonly used for small animal patients. The combination of guaifenesin, ketamine, and xylazine or inhalant anesthetic can be used to maintain anesthesia for longer procedures. Recovery is typically smooth and without complications, but simple assistance can prevent premature attempts at recovery.

As more equine practitioners are working abroad in equitarian programs or at home on client donkeys, it is important that they are comfortable anesthetizing these patients.

References and Footnotes