Sedation and Anesthesia in Donkeys and Mules

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Despite similarities with horses, donkeys and mules have unique characteristics that should be considered before sedating and anesthetizing these animals.

Behavioral differences:
- Donkeys become immobile when facing new situations (i.e. environment)
  - After acclimation it is easier to handle them (patience is required!)
  - Nose twitches are not very effective (hard to place and they slide off easily)
  - Head ropes tied to a fixed object may work
- Mules can be even more difficult that donkeys
  - They are larger and can be more dangerous
  - Easier if they are trained
  - Individual variability
- Both can bite and kick without warning
- They are very stoic and assessing pain can be challenging

Anatomical differences:
- Jugular vein is deeper than in horses
  - Thick skin and cutaneous colli muscle
  - Since the cutaneous colli muscle is thick and is located over the jugular vein, distention of this vein can be achieved using a neck rope
  - Angle the needle more perpendicular to the skin than in horses
  - Use lidocaine SQ and make a small skin incision before placing the catheter
- Branches of the facial artery may have different anatomical location than in horses
  - Finding the pulse and placing arterial catheters can be more challenging

Physiological differences:
- In donkeys PCV increases only when severely dehydrated (20-30%). Mild dehydration is hard to assess
- Donkeys’ body temperature can increase more than in horses when exposed to hot climate and after exercise
- Donkeys’ resting respiratory rate is 20-30 breaths/min, which is higher than in horses
- Heart rate is similar to horses and it is a good indicator of pain (better than behavioral changes)
- Mules and donkeys metabolize drugs differently that horses, and they can be more or less sensitive to some drugs (doses and/or intervals should be modified)
Anesthesia

Premedication:
- Similar drugs used in horses
- Detomidine 5-10 μg/kg provides adequate analgesia, which becomes profound at 20-40 μg/kg. Sedation is adequate and increases slightly at 40 μg/kg. Duration of sedation is dose-dependent
- Sublingual detomidine gel has been used in donkeys (20-40 μg/kg)
  - Sedation and analgesia within 30-40 min
  - Sedation is dose-dependent (better at 40 μg/kg)
- Acepromazine 0.04-0.05 mg/kg provides adequate sedation but does not increase sedation when combined with detomidine in donkeys
- Mules require 50% more xylazine than horses and donkeys (1-1.6 mg/kg)
- Untrained, excited, and feral donkeys and mules are dangerous and might require more drugs
- Donkeys may lie down after premedication (general anesthesia can be induce in sternal recumbency)

Induction and maintenance of general anesthesia:
- Ketamine and diazepam are usually used to induce anesthesia
- Ketamine is more rapidly metabolized and redistributed in mules and donkeys
  - It only lasts 10-15 min
  - Needs to be re-dosed more frequently
- This rapid metabolism of ketamine is especially evident in miniature donkeys
- Anesthesia can be maintained with xylazine/ketamine IV boluses or GKX
- Donkeys are more sensitive to respiratory depression caused by guaifenesin
  - GKX for donkeys (5% GG 1L + xylazine 500 mg + ketamine 2 gr). Two grams of ketamine are recommended due to the rapid metabolism and to reduce the amount of GG administered.
- Tilazol (tiletamine + zolazepam) can be used for a slightly longer duration of anesthesia (1.1 mg/kg) in miniature donkeys
- Isoflurane and sevoflurane are used for procedures longer than 1 hour and their effects are similar to the ones described in horses
- Dwarf-like miniature donkey may have hypoplastic trachea and abnormal airway (keep head and neck extended and place endotracheal tube if possible)

Monitoring:
- Eye signs (palpebral and nystagmus) are similar to horses, but less reliable in donkeys
- Blood pressures are good indicator of the plane of anesthesia
- Respiratory rate is higher in donkeys compared to mules. Like in horses, breath holding might indicate a light plane of anesthesia
Recovery and analgesia:

- Donkeys lie down until they are able to stand. Recovery is usually calmer than in horses.
- Recovery in mules is variable and assisted recovery might be needed.
- Myositis and myopathies can occur in mules, especially draft mules, but unlikely in donkeys.
- For analgesia alpha-2 agonists and opioids can be used for analgesia:
  - Mules require higher doses of xylazine.
  - Butorphanol is used at 0.02-0.04 mg/kg in donkeys and mules.
- NSAIDs can be used for pain management:
  - Phenylbutazone 4.4 mg/kg IV, PO bid-tid in donkeys and bid in mules.
  - Flunixin 1.1 mg/kg IV tid in donkeys.
- Administration of analgesic agents might have to be repeated more frequently than in horses.
- Frequent assessment for signs of pain is recommended.