Intramuscular Induction Protocols for Healthy Dogs and Cats

Sometimes, IM induction protocols are necessary in healthy patients. Making that choice and picking a protocol are some of the many decisions required for a smooth anesthetic event. Review these combinations and consider which might be the most beneficial for each patient.

Drug Combinations	Dose (mg/kg)	Comments	Dosing Example
Dexmedetomidine* + **Ketamine** + **Opioid of choice (see Figure 6)**	0.005–0.01 + 3–10 + Drug specific	Most commonly used in cats but also acceptable for small dogs (the volume is fairly large for IM injection in medium-large dogs) **Quick tip:** The combination is generally dosed as approximately 0.1–0.2 **mL** per **4.5 kg (10lb)** patient body weight of **each** drug. The low end of the dose is used for moderate sedation, the high end of the dose for deep sedation/induction/light anesthesia. For use in dogs, the dexmedetomidine dose is sometimes decreased slightly and the opioid volume may increase, depending on drug selection	Induction for a 4.5 kg (10lb) cat would be: 0.2 mL of 0.5 mg/ml dexmedetomidine + 0.2 mL ketamine + 0.2 mL 10 mg/mL butorphanol or 0.3 mg/mL buprenorphine†
Tiletamine and Zolazepam	3–10	Administer with a sedative (e.g., dexmedetomidine) or in sedated patient to decrease the dose and the likelihood of rough recoveries Cautions: Can cause prolonged, "rough," or dysphoric recovery, especially in unsedated dogs. May sting on injection. Tiletamine has the same cautions as ketamine and same alleviation of adverse effects because it is combined with a benzodiazepine	Can be administered IM as a sedative (see Figure 2)
Dexmedetomidine + **Tiletamine and Zolazepam** + **Butorphanol**	See comments Same dosages for dogs and cats	**Cautions:** Potent combination, dose carefully **Note:** Butorphanol provides only mild analgesia, use multimodal analgesic protocols	Reconstitute tiletamine/zolazepam powder with 2.5 mL 0.5 mg/mL dexmedetomidine and 2.5 mL 10 mg/mL butorphanol for a final concentration of 100 mg of tiletamine-zolazepam, 0.25 mg dexmedetomidine and 5 mg of butorphanol, and per mL of mixture Dose at 0.005 (light sedation to 0.04 (moderate plane of anesthesia) mL/kg

The sedative and induction drugs can be combined in the same syringe and administered IM in healthy patients. Although these protocols are also acceptable for patients with mild disease, since the drugs cannot be titrated "to effect," an IV induction protocol is preferred for patients with moderate disease, neonates and "true" geriatrics (i.e., those showing age-related changes). Conversely, an IM protocol is often preferred—and sometimes the only reasonable choice—for patients that are fractious and/or aggressive. Profound sedation can occur rapidly, so intubation tools and oxygen should be available. The low-end of the dosages is used for moderate sedation, the high end of the dosages for deep sedation/light anesthesia, which can be both anesthesia induction and maintenance for short procedures.

* Medetomidine can be used at the same volumes as dexmedetomidine in the protocols listed as **mL/kg** but the mg/kg dose is double that of dexmedetomidine

† For other opioids, the volume must be calculated as the 0.1–0.2 mls may not be appropriate for all opioids.

The *2020 AAHA Anesthesia and Monitoring Guidelines for Dogs and Cats* are available at aaha.org/anesthesia.