Ketamine hydrochloride

**Description**

Ketamine hydrochloride is a rapid acting dissociative which effects profound analgesia. Although it can be used alone in many species, ketamine is an essential component of many successful drug combinations used in wildlife.

First synthesized in 1962, ketamine hydrochloride was initially developed as a safer anesthetic alternative to phencyclidine in human medicine. Ketamine was used in psychiatric and other academic research in the 1970's that documented its hallucinogenic and psychedelic effects. Today, its illicit recreational use, which is internationally recognized, prompted the DEA to schedule ketamine as a CIII under the Controlled Substance Act in 1999.

**Indications:**

**Wildlife Management**

Ketamine has been widely used in veterinary medicine for its analgesic and anesthetic effects in small animals. Veterinarians often use ketamine in combination with sedative drugs to produce a balanced anesthesia and to prevent pain by a constant rate infusion. Ketamine has a wide and vast use in non-domestic species. Due to its relatively short action it has been commonly used in combination with the common alpha-two agonist xylazine to great effect in numerous species. More recently it has found a broader species use combined with the newer more potent alpha-two agonist medetomidine. Ketamine has a synergistic effect with medetomidine in elk, which has been reported anecdotally by many field studies.

Ketamine has been similarly reported to have a synergistic effect on etorphine and possibly other potent opiate agonists.

Through use of concentrated formulations [up to 200 mg/ml] ketamine has broad application in field anesthesia procedures and protocols. In many situations, due to its rapid metabolism, intravenous ketamine can be used to extend anesthesia for short periods in field situations to enable completion of necessary procedures.

*Please consult Kreeger’s Handbook of Wildlife Chemical Immobilization for individual species dosages, as well as recommended drugs to use in combination with ketamine hydrochloride for various species.*

**Domestic Species**

Ketamine hydrochloride is commonly used in cats and horses.

**Chemistry & Pharmacology**

Ketamine hydrochloride is a rapid-acting dissociative whose pharmacological action is characterized by profound analgesia, normal pharyngeal-laryngeal reflexes, mild cardiac stimulation and respiratory depression. Skeletal muscle tone is variable and may be normal, enhanced or diminished.

The anesthetic state produced does not fit into the conventional classification of anesthetic stages. Instead, ketamine produces a state of unconsciousness that has been termed “dissociative” in that it appears to selectively interrupt association pathways to the brain before producing somesththetic sensory blockade.

The chemical name for ketamine is 2-(2-chlorophenyl)-2-(methylamino)-cyclo-hexane hydrochloride.

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Pharmacokinetics

Following administration of the recommended dose, felids become ataxic in about 5 minutes with anesthesia usually lasting from 30-45 minutes at higher doses. Complete recovery usually occurs in about 4 to 5 hours at lower doses but recovery may be prolonged up to 24 hours with higher doses.

In twelve species of primates, studies demonstrated that the median time to restraint ranged from 1.5 to 5.3 minutes with the median duration of restraint from 20 to 55 minutes depending on dose. Recovery was generally smooth and uneventful.

Dosage & Administration

Felids: a dose of 11mg/kg is recommended to produce restraint. Dosages from 22 to 33mg/kg produce anesthesia that is suitable for diagnostic or minor surgical procedures that do not require skeletal muscle relaxation.

Primates: recommended restraint and anesthesia dosages vary by species. Please consult Kreeger’s Handbook of Wildlife Chemical Immobilization for individual species dosages, as well as recommended drugs to use in combination with ketamine hydrochloride for various species.

An intramuscular single dose injection has a wide margin of safety in felids and sub-human primates.

How Supplied

Ketamine HCl was approved by FDA in the 1960s in the 50mg/ml and 100mg/ml strengths. Ketamine hydrochloride is available from ZooPharm in a 200mg/ml concentration.

Contraindications & Precautions

Ketamine hydrochloride should not be used in felids or sub-human primates with hepatic or renal insufficiency.

When using ketamine in combination with an alpha-two agonist, one should always let at least 20 minutes pass before reversing the alpha-two to insure that the ketamine has been metabolized and that no ketamine effect is left. If the alpha-two is reversed too soon, the clinical presentation in some species (especially bears) can be difficult to manage.

**ADVERSE REACTION**

Respiratory depression may occur following administration of high doses of ketamine hydrochloride. If at any time, an animal becomes cyanotic, resuscitative measures should be instituted promptly. Adequate pulmonary ventilation using oxygen or room air is recommended as a resuscitative measure.

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