

Doxapram:

SCHEDULING STATUS: S4

CURRENTLY COMPOUNDED FORMULATIONS:

Active ingredient(s)	Injectable	Oral equine paste	Oral carnivore paste	Orals for exotics	Oral solution/suspension	Topical treatment	Shampoo	Capsules/Tablets	Oral powder
Doxapram hydrochloride	✓								

REGISTERED PRODUCT/ TRADE NAME: No veterinary-labelled products available. Dopram®-V (discontinued)

PHARMACOLOGICAL CLASSIFICATION: CNS/Respiratory stimulant

PHARMACOLOGICAL ACTION: Doxapram is a general CNS stimulant, with all levels of the CNS affected. The effects of respiratory stimulation are a result of direct stimulation of the medullary respiratory centers and, possibly, through the reflex activation of carotid and aortic chemoreceptors. Transient increases in respiratory rate and volume occur, but increases in arterial oxygenation usually do not ensue. This is because doxapram usually increases the work associated with respirations with resultant increased oxygen consumption and carbon dioxide production.^[1]

INDICATIONS: For dogs, cats, and horses: To stimulate respiration during and after general anesthesia and/or to speed awakening and reflexes after anesthesia. For neonatal dogs and cats: stimulate respirations following dystocia or cesarean section. Doxapram has been used for treatment of CNS depression in food animals (not approved) and has been suggested as a treatment of respiratory depression in small animals caused by reactions to radiopaque contrast media or for barbiturate overdosage (see precautions below). The use of doxapram to initiate and stimulate respirations in newborns is somewhat controversial as the drug has been shown in experimental animals to increase myocardial oxygen demand and reduce cerebral blood flow. Doxapram has been shown to be useful to offset suppression of general anesthetic agents when laryngeal function is being assessed.^[1]

DOSAGE AND DIRECTIONS FOR USE:

DOGS:

1.1 mg/kg (for gas anesthesia) or 5.5 – 11 mg/kg (for barbiturate anesthesia) IV; adjust dosage for depth of anesthesia, respiratory volume and rate. Dosage may be repeated in 15 – 20 minutes if necessary.^[1]

To initiate or stimulate respirations in neonates after caesarian section or dystocia: May be administered either SC, sublingually, or via the umbilical vein in doses of 1 – 5 drops (1 – 5 mg) depending on size of neonate and degree of respiratory crisis.^[1]

To assess laryngeal function: 2.2 mg/kg IV to stimulate respiration and increase intrinsic laryngeal motion. Onset of effect occurs within 15 – 30 seconds and persists for approximately 2 minutes. Anesthetic depth may lighten substantially. Prepare for immediate intubation should airway obstruction or laryngeal paralysis occur. (McKiernan 2007)^[1]

CATS:

1.1 mg/kg (for gas anesthesia) or 5.5 – 11 mg/kg (for barbiturate anesthesia) IV; adjust dosage for depth of anesthesia, respiratory volume and rate. Dosage may be repeated in 15 – 20 minutes if necessary.^[1]

To initiate or stimulate respirations in neonates after caesarian section or dystocia: May be administered either SC, or sublingually in doses of 1 – 2 drops (1 – 2 mg) depending on severity of respiratory crisis.^[1]

Cats: 5 – 10 mg/kg IV (Boothe 1990)^[1]

RABBITS/ RODENTS/ SMALL MAMMALS:

For respiratory depression:

- Rabbits: 2 – 5 mg/kg SC or IV q15 minute
- Rodents: 2 – 5 mg/kg S C q15 minutes (Huerkamp 1995)
- Mice, Rats, Gerbils, Hamsters: 5 – 10 mg/kg IV;
Guinea pigs: 5 mg/kg IV;
Chinchillas: 2 – 5 mg/kg IV (Adamcak and Otten 2000)^[1]

AVIAN:

For respiratory depression: 5 – 10 mg/kg IM or IV (Harris 2003)^[1]

REPTILES:

To stimulate respiration after general anesthesia: 5 mg/kg IV (Wilson 2002b)

CATTLE & SWINE:

- For primary apnea in newborn calves: 2 mg/kg IV (Constable 2006)
- 5 – 10 mg/kg IV (Howard 1986)

HORSES:

- 0.44 mg/kg (for halothane, methoxyflurane anesthesia) or 0.55 mg/kg (for chloral hydrate ± magnesium sulfate anesthesia) IV; adjust dosage for depth of anesthesia, respiratory volume and rate. Dosage may be repeated in 15 – 20 minutes if necessary.^[1]

WARNINGS/ PRECAUTIONS/ CONTRA-INDICATIONS:

- Doxapram should not be used as a substitute for aggressive artificial (mechanical) respiratory support in instances of severe respiratory depression.^[1]
- Contraindications from the human literature include: seizure disorders, head trauma, uncompensated heart failure, severe hypertension, cardiovascular accidents, respiratory failure secondary to neuromuscular disorders, airway obstruction, pulmonary embolism, pneumothorax, acute asthma, dyspnea, or whenever hypoxia is not associated with hypercapnia. Doxapram should be used with caution in patients with a history of asthma, arrhythmias, or tachycardias. It should be used with extreme caution in patients with cerebral edema or increased CSF pressure, pheochromocytoma or hyperthyroidism. Patients with a history of hypersensitivity to the drug or are receiving mechanical ventilation should not receive doxapram. The above contraindications/precautions are not listed in the veterinary product literature provided by the manufacturer.^[1]
- Reported LD50 for IV administration in neonatal dogs and cats is approximately 75 mg/kg. Clinical signs of overdosage include: respiratory alkalosis, hypertension, skeletal muscle hyperactivity, tachycardia, and generalized CNS excitation including seizures. Treatment is supportive. Drugs such as short acting IV barbiturates may be used to help decrease CNS hyperactivity. Oxygen therapy may be necessary.^[1]
- Avoid the use of a single injection site for a prolonged period of time or extravasation when administering intravenously. Subcutaneous injection has been recommended however for use in neonatal feline and canine patients.^[1]
- Repeated IV doses in neonates should be done with caution as the product contains benzyl alcohol.^[1]

REFERENCES:

1. Plumb's Veterinary Drug Handbook, Sixth edition, by Donald C. Plumb