DEXDOMITOR®

dexmedetomidine hydrochloride 0.5 mg/ml

ORION PHARMA Animal Health





Dexdomitor® CRI: clinical evidence and applications

New indication: To be administered intravenously as a constant rate infusion (CRI) in dogs and cats as part of a multimodal protocol during inhalation anaesthesia.

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Dexmedetomidine CRI as part of multimodal anaesthesia

Multimodal general anaesthesia—also referred to as **balanced anaesthesia**—uses complementary drug classes and techniques to achieve the desired level of hypnosis, analgesia, muscle relaxation, and autonomic stability while limiting dose-dependent effects of any single agent.[1,2] When intravenous agents are used alongside inhalation maintenance, the approach is often termed **partial intravenous anaesthesia (PIVA)**.[3]

Inhalant anaesthetics such as isoflurane and sevoflurane remain essential components of these protocols because of their predictable effects and ease of titration.[4,5] However, as they provide limited antinociception and their cardiovascular and respiratory effects are dose-dependent,[4-7] adjunctive agents are commonly incorporated to help optimise anaesthetic depth and maintain physiological stability.[2,8,9]

Integrating **intravenous infusions**—such as dexmedetomidine administered as a **constant rate infusion (CRI)**—with inhalation maintenance allows the anaesthetic plan to be tailored more precisely.[10,11] Published studies in healthy ASA I–II dogs and cats report that **dexmedetomidine CRI as part of a multimodal protocol** can reduce inhalant requirements, help maintain arterial blood pressure, and contribute to perioperative analgesia.[3,10–17]

Bolus dosing vs. CRI of dexmedetomidine

Dexmedetomidine (Dexdomitor®) is a highly selective **α_2-adrenergic agonist** producing dose-dependent sedation, analgesia, and muscle relaxation. These effects arise from central α_{2A}-receptor activation, reducing sympathetic tone and modulating nociceptive transmission.[18]

When administered as an **intravenous bolus**, dexmedetomidine produces a **rapid increase in plasma concentration**, resulting in a transient peak effect. This is associated with strong peripheral α_{2B}-receptor stimulation, increased systemic vascular resistance, and baroreflex-mediated reduction in heart rate.[18] In contrast, administration as a **CRI** maintains **more stable plasma concentrations** and results in a **smoother cardiovascular profile**.[9–11] This facilitates titration to effect and limits the concentration fluctuations typically observed with bolus dosing (Fig. 1).

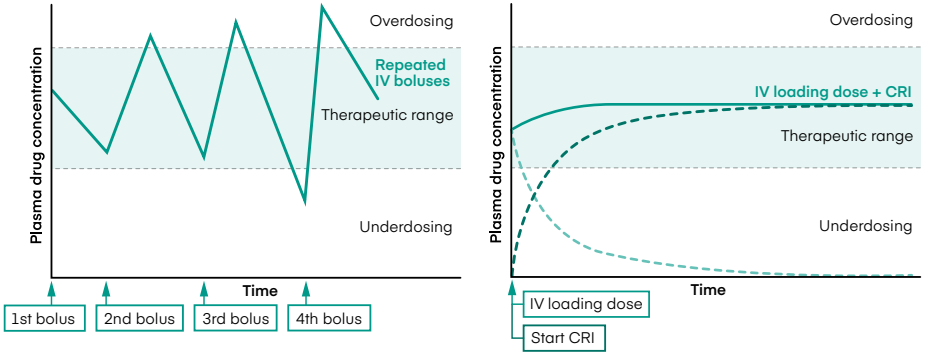


Figure 1. Repeated IV bolus doses (left) produce fluctuating plasma concentrations, creating a characteristic 'saw-tooth' pattern that can result in transient periods of under- or overdosing. In contrast, a constant rate infusion (CRI) with a small loading dose (right) maintains a steadier plasma concentration, supporting a more consistent drug effect. The curves shown are illustrative and do not represent specific pharmacokinetic data.

Clinically, studies incorporating dexmedetomidine CRI have reported **more consistent heart rate and blood pressure profiles**, supporting stable intraoperative haemodynamics.[11,12,14,17]

Clinical relevance and patient selection

Dexmedetomidine CRI during inhalation maintenance has been evaluated in **healthy ASA I–II dogs and cats**, in which its efficacy and safety are well supported by clinical studies.[3,11,12,14–17] By reducing inhalant requirements and contributing to perioperative analgesia, dexmedetomidine CRI has been reported to **attenuate sympathetic responses** to surgical stimulation and **promote haemodynamic stability**.[11,12,14–17]

It has been studied in **moderate to long painful procedures**—such as orthopaedic or major soft tissue surgeries—where haemodynamic control and sustained analgesia are priorities.[11,12,14-17]

Use of dexmedetomidine is contraindicated in animals with **cardiovascular disorders, severe systemic illness, moribund conditions,** or **known hypersensitivity to dexmedetomidine or any of the excipients of Dexdomitor.**

Inhalant-sparing effects

Dexmedetomidine CRI has been reported to produce a **dose-dependent reduction in inhalant anaesthetic requirements** in both species:

- **Dogs:** Infusions of **0.5–1 µg/kg/h** typically reduce isoflurane or sevoflurane requirements by approximately **20–30%**, consistent with both experimental MAC studies and clinical observations.[1,11,19,20]

- **Cats:** Infusions of **0.5–3 µg/kg/h** reduce isoflurane requirements by approximately **20–30%** in clinical anaesthesia, although larger reductions have been reported under experimental conditions.[3,17,21]

The inhalant-sparing effect contributes to reduced inhalant-induced cardiovascular depression during anaesthesia and is an important component of multimodal anaesthetic protocols.[1,2,11]

Haemodynamic effects

Dexmedetomidine CRI has been reported to support **haemodynamic stability** during inhalation anaesthesia in healthy ASA I–II dogs and cats.[3,11–17] This effect likely reflects the combined influence of **reduced inhalant requirements**—limiting inhalant-associated vasodilation and myocardial depression—and **mild peripheral α_2-mediated vasoconstriction**, which together help maintain vascular tone and mean arterial pressure.[1,11,12,14,20]

Although dexmedetomidine may **reduce heart rate and cardiac output**, at recommended low infusion rates these changes are generally **clinically acceptable** in healthy, normovolaemic patients under controlled anaesthesia.[3,11,14,17,26] Interpretation of bradycardia should be made in the context of arterial blood pressure and perfusion, as a reduced heart rate does not necessarily indicate inadequate cardiovascular function in this setting. [3,11,14,25]

In **dogs**, clinical studies using a dexmedetomidine infusion at 1 µg/kg/h have demonstrated **reduced incidence of hypotension** (from 65% to 9%[12]) and **decreased vasopressor requirement** (from 8/10 dogs to only 2/10 dogs[16]).

In **cats**, dexmedetomidine CRI at 1–3 µg/kg/h maintained a **steady heart rate** across all doses and **stable blood pressure** at 1–2 µg/kg/h, with a moderate, well-tolerated increase observed at 3 µg/kg/h.[17] No cardiovascular instability was reported in the study.[17]

Species responses differ; dogs are more prone to **bradycardia** already at moderate doses[19,20] while cats may show **mild hypertension** at higher rates[17]. Within recommended infusion ranges (dogs 0.5–1 µg/kg/h; cats 0.5–3 µg/kg/h), cardiovascular effects are generally predictable, controllable, and clinically well tolerated in healthy animals.



Analgesic and opioid-sparing effects

Dexmedetomidine enhances analgesia by activating α_{2A}-receptors in the brainstem (mainly locus coeruleus) and spinal cord, **dampening nociceptive transmission** both supraspinally and at the spinal level. These mechanisms complement opioids and local anaesthetics, providing synergistic antinociceptive effects.[18]

In **dogs**, dexmedetomidine CRI at 1 µg/kg/h has been shown to:

- **Prolong** the duration of spinal and peripheral nerve blocks by ~40–50%[12,15,16]
- **Reduce** intraoperative fentanyl requirements[16] and
- **Reduce or delay** the need for postoperative rescue analgesia.[15,16]

In **cats**, infusion rates of 2–3 µg/kg/h have been reported to **reduce** the need for intraoperative opioid supplementation and to **improve** postoperative comfort.[17]

Together, these findings suggest that dexmedetomidine CRI may reduce additional analgesic requirements and enhance **analgesic quality and duration**. Importantly, postoperative analgesia likely reflects the prolonged effects of co-administered analgesics potentiated by dexmedetomidine, rather than residual drug levels after CRI cessation.[15,16]



Respiratory effects and oxygenation

Dexmedetomidine CRI has shown **minimal direct respiratory depressant effects** during inhalation anaesthesia. In dogs and cats—under spontaneous breathing or mechanical ventilation—studies show preserved respiratory rate, end-tidal CO_2, and oxygenation within recommended infusion ranges.[3,10,11,13,17,24]

- **Minimal respiratory depression:** Recommended infusion rates did not significantly alter RR or $ETCO_2$ in spontaneously breathing or mechanically ventilated dogs and cats.[3,10,11,13,17,24]
- **Improved oxygenation and respiratory mechanics:** In mechanically ventilated dogs, dexmedetomidine at 1 µg/kg/h improved oxygenation and respiratory mechanics, indicating improved respiratory efficiency.[14]
- **Preserved oxygen delivery:**
  - Spontaneously breathing dogs: 0.5–1 µg/kg/h maintained normal PaO_2, $PaCO_2$, lactate, and acid–base balance.[10,24,26]
  - Mechanically ventilated dogs: 0.5 µg/kg/h preserved the oxygen delivery index despite mild cardiac index reduction; 1 µg/kg/h maintained low lactate levels.[11,25]

Recovery and postoperative comfort

Dexmedetomidine CRI is reported to have a **short elimination half-life in dogs** (~28 minutes with a ~1 µg/kg loading dose and ~1 µg/kg/h CRI under isoflurane[10]), and clinically relevant **accumulation has not been observed** even after several hours of infusion.[10,19] Clinical effects therefore diminish relatively rapidly after discontinuation, with recovery milestones—such as return to sternal recumbency—typically occurring within approximately 30 minutes.[10,15]

In **cats**, pharmacokinetic CRI data are limited, and **elimination is considered slower** than in dogs.[27] Clinical observations indicate that sedative effects generally diminish within approximately 30 minutes, although later recovery milestones (e.g., standing) may be prolonged at an infusion rate of 3 µg/kg/h.[17]

Despite mild dose-dependent prolongation at higher infusion rates, overall **recovery quality** is reported as **good** in both species. Mild residual sedation may reduce excitatory emergence, and both dogs and cats generally exhibit **calm, smooth recoveries**.[3,10,15-17] In cats, infusion rates of 2–3 µg/kg/h have been associated with **reduced postoperative agitation and dysphoria**.[17]

Dosing

Dexmedetomidine CRI is well tolerated in healthy dogs and cats when used within the following ranges:

- **Both species:** loading dose of 0.5–1 µg/kg IV over ≥10 minutes (not given if dexmedetomidine is used in premedication)
- **Dogs:** 0.5–1 µg/kg/h
- **Cats:** 0.5–3 µg/kg/h*

* In general, cats may require higher infusion rates than dogs to achieve comparable clinical effects.[3,17]

For more information about administration and monitoring, see our "Practical guide to Dexdomitor® CRI".



Key take-home messages

- **Indication/use:** Dexdomitor® may be administered intravenously as a CRI in dogs and cats as part of a multimodal protocol alongside inhalation anaesthesia.
- **Patient selection:** Studied in healthy ASA I–II dogs and cats.
- **Inhalant-sparing:** Dose-dependent reduction of isoflurane or sevoflurane requirements.[1,3,11,17,19–21]
- **Haemodynamic support:** Associated with improved arterial blood pressure control and reduced incidence of hypotension.[3,11–17]
- **Analgesia and recovery:** Contributes to intra- and postoperative analgesia[12,15–17]; supports calm recovery.[3,10,15–17]
- **Recommended CRI rates:** Dogs 0.5–1 µg/kg/h, cats 0.5–3 µg/kg/h; (+/- IV loading dose 0.5–1 µg/kg).

References:

1. Ebner LS, et al. Am J Vet Res 2013;74:963–970.
2. Brown EN, et al. Anesth Analg 2018;127:1246–1258.
3. Simon BT, et al. Vet J 2018;234:55–60.
4. Mutoh T, et al. Am J Vet Res 1997;58:885–890.
5. Pypendop BH, Ilkiw JE. Am J Vet Res 2004;65:20–25.
6. Sousa MG, et al. Vet Anaesth Analg 2008;35:185–190.
7. Çeçen G, et al. Ankara Üniv Vet Fak Derg 2009;56:255–261.
8. de Boer HD. Analgesia during surgery (medications). Enhanced Recovery After Surgery 2020;141–147.
9. Di Franco C, et al. Front Vet Sci 2023;10:1135124.
10. Lin GY, et al. Vet Anaesth Analg 2008;35:141–153.
11. Uilenreef JJ, et al. Vet Anaesth Analg 2008;35:1–12.
12. Sarotti D, et al. Res Vet Sci 2019;124:93–98.
13. Carvalho ER, et al. Vet Anaesth Analg 2019;46:43–54.
14. Di Bella C, et al. Can J Vet Res 2020;84:96–107.
15. Stabile M, et al. Front Vet Sci 2023;9:1061605.
16. Di Franco C, et al. Sci Rep 2024;14:17113.
17. Stabile M, et al. J Feline Med Surg 2025;27:1098612X251330169.
18. Gertler R, et al. Proc (Bayl Univ Med Cent) 2001;14:13–21.
19. Pascoe PJ, et al. Vet Anaesth Analg 2006;33:97–103.
20. Akashi N, et al. Vet Anaesth Analg 2020;47:490–498.
21. Raue JF, et al. BMC Vet Res 2019;15:258.
22. Ilkiw JE. Clin Tech Small Anim Pract 1999;14:27–37.
23. Grubb T, et al. J Am Anim Hosp Assoc 2020;56:59–82.
24. Congdon JM, et al. Vet Anaesth Analg 2013;40:464–471.
25. Akashi N, et al. J Vet Med Sci 2021;83:285–296.
26. Pascoe PJ. Vet Anaesth Analg 2015;42:360–368.
27. Escobar A, et al. Am J Vet Res 2012;73:285–289.

DEXDOMITOR® 0.5 MG/ML SOLUTION FOR INJECTION
ACTIVE SUBSTANCE: Dexmedetomidine hydrochloride. **TARGET SPECIES:** Dogs and cats. **INDICATIONS FOR USE:** Sedation and analgesia, premedication, and constant rate infusion during inhalation anaesthesia. **ADMINISTRATION:** IM or IV (cats: IV only for CRI); see SPC for dosage. **CONTRAINDICATIONS:** Cardiovascular disorders, severe systemic disease, moribund animals, hypersensitivity. **ADVERSE REACTIONS:** Include bradycardia, arrhythmia, heart block, pale/cyanotic mucosa, vomiting; see SPC for the full information. **PREGNANCY/LACTATION:** Not recommended. **INTERACTIONS:** CNS depressants may enhance effects; caution with anticholinergics. **LEGAL STATUS:** Prescription-only veterinary medicine. **COMPLETE PRODUCT INFORMATION:** https://medicines.health.europa.eu/veterinary/en/600000003547. **FURTHER INFORMATION AVAILABLE ON REQUEST:** Orion Pharma Animal Health, Orion Corporation, Espoo, Finland.

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