

Dexmedetomidine Publications

Dexmedetomidine has been recently launched across the UK and the rest of Europe as a sedative and premedication agent in dogs and cats.

Dexmedetomidine is the first isomer specific drug to be licensed in animals and represents a leap forward in the development and use of stereospecific agents and a move away from the use of non specific racemic mixtures.

The advantages of dexmedetomidine over medetomidine can be briefly listed as follows:

- Greater specificity for the alpha 2 adrenoreceptor compared to medetomidine
- More reliable sedation and greater analgesic potency compared to medetomidine.
- Reduced metabolic burden, due to removal of inactive levomedetomidine from the drug mixture.
- Quicker recoveries from anaesthesia (levomedetomidine has been shown to slow the liver metabolism of other drugs).

The abstracts that I have chosen to showcase in the first issue of the educational updates describe the use of dexmedetomidine for circumstances for which it is not usually employed in veterinary anaesthesia; prevention of post-operative shivering, use during ophthalmic surgery to lower or manage intraocular pressure. Intranasal use of dexmedetomidine and a study describing a potential mechanism for dexmedetomidine mediated analgesia is also described.

Dexmedetomidine and postoperative shivering in patients undergoing elective abdominal hysterectomy.

Elvan EG, Oç B, Uzun S, Karabulut E, Coşkun F, Aypar U.

[Eur J Anaesthesiol.](#) 2008 Jan 21;:1-8

BACKGROUND: Post-anaesthetic shivering is one of the most common complications, occurring in 5-65% of patients recovering from general anaesthesia and 33% of patients receiving epidural anaesthesia. Our objective was to investigate the efficacy of intraoperative dexmedetomidine infusion on postoperative shivering.

METHODS: Ninety female patients, ASA I-II, 35-60 yr old, scheduled for elective total abdominal hysterectomy with or without bilateral salpingo-

oophorectomy were randomized into two groups. After endotracheal intubation one group received normal saline infusion and the other received dexmedetomidine as a loading dose of 1 $\mu\text{g kg}^{-1}$ for 10 min followed by a maintenance infusion of 0.4 $\mu\text{g kg}^{-1} \text{ h}^{-1}$. In the recovery room, pain was assessed using a 100 mm visual analogue scale and those patients who had a pain score of more than 40 mm were administered 1 mg kg^{-1} intramuscular diclofenac sodium. Patients with shivering grades more than 2 were administered 25 mg intravenous meperidine. Patients were protected with passive insulation covers.

RESULTS: Post-anaesthetic shivering was observed in 21 patients in the saline group and in seven patients in the dexmedetomidine group ($P = 0.001$). Shivering occurred more often in the saline group. The Ramsay Sedation Scores were higher in the dexmedetomidine group during the first postoperative hour. Pain scores were higher in the saline group for 30 min after the operation. The need for intraoperative atropine was higher in the dexmedetomidine group. Intraoperative fentanyl use was higher in the saline group. Perioperative tympanic temperatures were not different between the groups whereas postoperative measurements were lower in the dexmedetomidine group ($P < 0.05$).

CONCLUSION: Intraoperative dexmedetomidine infusion may be effective in the prevention of post-anaesthetic shivering.

. Epub 2008 Feb 19.

[Links](#)

Effect of dexmedetomidine premedication on the intraocular pressure changes after succinylcholine and intubation.

Mowafi HA, Aldossary N, Ismail SA, Alqahtani J.

[Br J Anaesth.](#) 2008 Apr;100(4):485-9

BACKGROUND: Succinylcholine is still recommended for some situations in open globe injuries. However, the use of succinylcholine is associated with an increase in intraocular pressure (IOP). This may be deleterious in open globe injuries. No method has previously been shown to abolish completely this rise in the IOP. We investigated whether dexmedetomidine, an alpha-2 agonist, could attenuate this increase in the IOP after succinylcholine and intubation.

METHODS: Forty patients with no pre-existing eye disease undergoing general anaesthesia were randomly premedicated by i.v. dexmedetomidine 0.6 $\mu\text{g kg}^{-1}$, or saline. Heart rate (HR), mean arterial pressure (MAP), and IOP (using Schioetz tonometer) were measured before, after the premedication, after

thiopental, after succinylcholine, immediately after intubation, and then every 2 min for 6 min.

RESULTS: Succinylcholine and intubation increased IOP in both groups. However, in the dexmedetomidine group, the IOP rise was not different from the baseline value ($P=0.65$) and was significantly lower than in the saline group ($P=0.003$). After intubation, the MAP in the control group was higher than that in the dexmedetomidine group ($P=0.041$) and exceeded the baseline value ($P<0.001$). The HR also showed less fluctuation in the dexmedetomidine group than in the saline group.

CONCLUSIONS: We conclude that dexmedetomidine could be a beneficial premedication in open globe injuries.

A double-blind, crossover assessment of the sedative and analgesic effects of intranasal dexmedetomidine.

Yuen VM, Irwin MG, Hui TW, Yuen MK, Lee LH.

[Anesth Analg.](#) 2007 Aug;105(2):374-80.

BACKGROUND: The alpha₂-receptor agonist, dexmedetomidine, provides sedation with facilitated arousal and analgesia with no respiratory depression. These properties render it potentially useful for anesthesia premedication, although parenteral administration is not practical in this setting. We designed this study to evaluate the sedative, anxiolytic, analgesic, and hemodynamic effects of dexmedetomidine administered intranasally in healthy volunteers.

METHODS: Koch's design for crossover trials (three-treatment and two-period design) was adopted. The study was double-blind and there were three treatment groups: A (placebo), B (intranasal dexmedetomidine 1 microg/kg) and C (intranasal dexmedetomidine 1.5 microg/kg). Each of the 18 subjects participated in two study periods. The study drug was administered intranasally after baseline observations of modified Observer Assessment of Alertness/Sedation Scale, visual analog scale of sedation, bispectral index, visual analog scale of anxiety, pain pressure threshold measured by an electronic algometer, systolic blood pressure (SBP) and diastolic blood pressure, heart rate, respiratory rate, and oxygen saturation. These were repeated during the course of the study.

RESULTS: Intranasal dexmedetomidine was well tolerated. Both 1 and 1.5 microg/kg doses equally produced significant sedation and decreases in bispectral index, SBP, diastolic blood pressure, and heart rate when compared with placebo ($P < 0.05$). The onset of sedation occurred at 45 min with a peak

effect at 90-150 min. The maximum reduction in SBP was 6%, 23%, and 21% for Groups A, B, and C respectively. There was no effect on pain pressure threshold, oxygen saturation or respiratory rate. Anxiolysis could not be evaluated as no subjects were anxious at baseline.

CONCLUSION: The intranasal route is effective, well tolerated, and convenient for the administration of dexmedetomidine. Future studies are required to evaluate the possible role of the noninvasive route of administration of dexmedetomidine in various clinical settings, including its role as premedication prior to induction of anaesthesia

Effects of alpha2-adrenoceptor agonists on tetrodotoxin-resistant Na⁺ channels in rat dorsal root ganglion neurons.

Oda A, Iida H, Tanahashi S, Osawa Y, Yamaguchi S, Dohi S.
[Eur J Anaesthesiol.](#) 2007 Nov;24(11):934-41. Epub 2007 Jun 14

BACKGROUND AND OBJECTIVE: When intrathecally or epidurally administered, alpha2-adrenoceptor agonists produce potent antinociception by affecting the activity of primary afferent fibres and spinal cord neurons. Recent reports have indicated that in dorsal root ganglion neurons, tetrodotoxin-resistant Na⁺ channels play important roles in the conduction of nociceptive sensation. We therefore investigated the effects of alpha2-adrenoceptor agonists on tetrodotoxin-resistant Na⁺ currents.

METHODS: Using the whole-cell patch-clamp technique, we recorded tetrodotoxin-resistant Na⁺ currents from rat dorsal root ganglion neurons.

RESULTS: Both clonidine and dexmedetomidine reduced the peak amplitude of the tetrodotoxin-resistant Na⁺ current concentration- and use-dependently. The concentration required for a half-maximal effect was significantly lower for dexmedetomidine (58.0 +/- 10.2 micromol) than for clonidine (257.2 +/- 30.9 micromol) at holding potential -70 mV. The current inhibitions induced by these agonists were not prevented by 1 micromol yohimbine, an alpha2-adrenoceptor antagonist. Both clonidine and dexmedetomidine shifted the inactivation curve for the tetrodotoxin-resistant Na⁺ current in the hyperpolarizing direction. The combinations clonidine with lidocaine and dexmedetomidine with lidocaine produced an additive blockade-type interaction on the tetrodotoxin-resistant Na⁺ current.

CONCLUSIONS: The results suggest that a direct inhibition of tetrodotoxin-resistant Na⁺ channels may contribute to the antinociceptive effects of clonidine and dexmedetomidine when used as additives to regional anaesthesia.