



Dexmedetomidine in neurosurgical spine procedures

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Introduction

Dexmedetomidine is an alpha 2 agonist with analgesic properties used intraoperatively as an alternative to opioids. Its antinociceptive effect is attributed to the stimulation of alpha 2 adrenoreceptors located in the central nervous system and spinal cord.

Purpose

To reduce the amount of narcotics perioperatively in neurosurgical spine patients.

Pharmacokinetics/Pharmacodynamics


Analgesia is produced by alpha 2 stimulation in the dorsal horn of the spinal cord.

- Decreases substance P; Decreases glutamate.

Sedation via presynaptic alpha 2 receptor stimulation in the CNS

- Decreased SNS tone produces sedation.

PRICING: \$\$\$

 Dexmedetomidine:
200mcg vial = \$1.73 each

 Fentanyl :
100 mcg vial = \$0.60

 Remifentanyl:
1mg vial = \$36.79

SAFETY:

BENEFITS:

- Safe for all ages
- Reduces emergence delirium
- Short acting
- No change in oxygenation
- No change in ICP
- No change in SSEP/MEP
- No change in CMRO2
- Decreases cerebral blood flow
- Resembles natural sleep
- Decreased PONV
- Reduced narcotic usage

RISKS:

- No amnesia
- Bradycardia
- Hypotension
- Delayed Emergence - no evidentiary confirmation

FACTS:



SEDATIVE:
Provides adequate sedation without causing respiratory depression



ANALGESIC:
Has analgesic properties, which reduces the need for narcotics

REDUCED OPIOID REQUIREMENTS:
Has sedation and analgesic properties so it reduces the side effects associated with narcotics such as: nausea, vomiting, and respiratory depression

ONSET/ ELIMINATION

- 1 **ONSET = 10 minutes**
- 2 **DURATION= 30 minutes**
- 3 **HALF LIFE= 2 Hours**
- 4 **CLEARANCE= P450 Enzymes in the Liver**

Recommendations/Dosing

-  Administer a combination of a bolus dose with a subsequent maintenance infusion:
-  Bolus dose: 0.3 mcg/kg - 1mcg/kg over 10-15 mins
Infusion: 0.2mcg/kg/hr to 0.6 mcg/kg/hr

Literature Search Results

A total of six research articles were reviewed to include; four systematic reviews and meta-analysis totaling 53 studies with 3379 patients, along with two randomized control trials totaling 172 patients. Out of the six research articles reviewed, five had strong statistical evidence that Dexmedetomidine showed a strong possibility of reduction in perioperative PACU opioid consumption as well as postoperative pain intensity. Other benefits demonstrated in the literature search showed a decrease in PONV, shivering, and respiratory depression. One research article concluded that 3 or more levels of spinal correction surgery did not show a decrease in perioperative narcotic usage. One demonstrated a reduction in narcotic usage in the first 24 hours with fewer adverse events related to opioid induced events, however it stated more research with quality studies are needed.

Articles are from 2012, 2015, 2018, 2021, 2022

Literature Review	Level of Evidence	Studies Reviewed	Total Patients	Confidence Intervals
4 Systematic Reviews	1	53	3379 with one meta analysis not reporting total number of patients.	95%
2 Randomized Control Trials	2	2 trials	172	95%

Discussion

Overall, the majority of the literature search shows that dexmedetomidine as an adjunct to managing perioperative pain has superior efficacy and also reduces the number of rescue analgesics needed. Another added benefit found is that it decreases PONV.

Conflict of Interest Statement

The authors declared that they had no conflicts of interest concerning their authorship or the publication of these articles.

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