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DEXMEDETOMIDINE: A REVIEW OF CLINICAL APPLICATIONS.

Anesthesiology

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ABSTRACT

Dexmedetomidine has gained popularity in anesthesia and critical care for use in deep sedation and analgesia due to a combination of its efficacy and safety compared with other available agents (e.g., opioids, benzodiazepines, propofol) conventionally used in these settings. This brief review is meant to introduce this unique agent For many clinical applications . Be sure to be clear in the abstract that more studies are warranted and its role is not well defined and is complicated by significant drug interactions, invasive i.v. route and has a significant side effect profile.

KEYWORDS

Introduction-

Dexmedetmidine is a potent alpha adrenergic agonist Dexmedetomidine was approved by FDA (Food and Drug Administration) in December, 1999 for use in human as a short term medication (< 24 hrs) for analgesia and sedation in Intensive care unit (ICU) ; under the trade name of "Precedex".

Availability - Dexmedetomidine is available as 100 mcg/ml in 0.5 ml, 1 ml & 2 ml Ampoule .

Pharmacology:

Mecanism of Action:- It is a centrally acting alpha-2 agonist having sedative & anaesthetic properties possibly by activating G- proteins in brainstem which results in inhibition of norepinephrine release. Highest densities of alpha-2 receptors is located in pontine locus cerulus. The sedative effect is produced due to inhibition of pontine locus ceruleus , an important nucleus mediating sympathetic nervous system function, vigilance, memory, analgesia & arousal.

Half Life – Elimination to terminal half life is 6 min to 2-3 hrs.
Highly protein bound- > 90%.
Volume of Distribution- 118 litre.
Metabolism- Extensive hepatic metabolism including glucoronidation & CYP2A6.
Total body clearance- 39 litre/hour.
Excretion- Urine (95%) , Feces(4%).

Uses:

1) Hypnotic.
2) Sedative (ICU & Procedural).
3) Analgesic.

Doses as per use:-

1) ICU Sedation- Loading Dose: 1mcg/kg I.V. over 15-20 min, Maintenance : 0.2-1 mcg/kg/hrs I.V.
2) Procedural Sedation- Loading Dose- 1mcg/kg I.V. over 15-20 min. , Maintenance : 0.5 – 0.7 mcg/kg/hrs I.V.
3) Adjuncts to Anaesthesia – Dexmedetomidine can also be used as adjuncts to general as well as regional anaesthesia.

In general anaesthesia – Loading dose : 1 mcg/kg over 15 min. ; Maintenance : 0.2 – 0.7 mcg/kg/hrs I.V., helps in reduction of requirements of inhalational agents.

In regional anaesthesia- 5-10 mcg of Dexmedetomidine mixed with local anaesthetic drugs to improve spinal/epidural anaesthesia & post operative analgesia. Exact mechanism of action is not known but it may be additive or synergistic effects secondary to different mechanism of action of local anaesthetics.

A part of above recommended dose, Dose should be titrated and reduced in case of geriatric use (Loading dose: <0.5 mcg/kg) & in case of hepatic / renal impairments. However for pediatric and obstetric use safety & efficacy not established till now.

Side Effects:

1) Severe Bradycardia.
2) Hypotension.
3) Heart block/ Cardiac arrest.

Antidote: Atipamazole- a specific alpha 2 recepter antagonist rapidly reverses the sedative and cardiovascular effects of I.V. Dexmedetomidine.

Conclusion: Dexmedetomidine has become popular and preferred sedative and analgesic, compared to other long acting sedatives/analgesics like as opioids; having ventillatory depressive side effects. However caution should be used when Dexmedetomidine is administered with vasodilators, cardiac depressants & other drugs that decreases heart rate.

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