Background

Comparing Dexmedetomidine to Opioids as Neuraxial Adjuvants to Local Anesthetics for Perioperative Pain Management During C-sections: A Systematic Review of Randomized Controlled Trials

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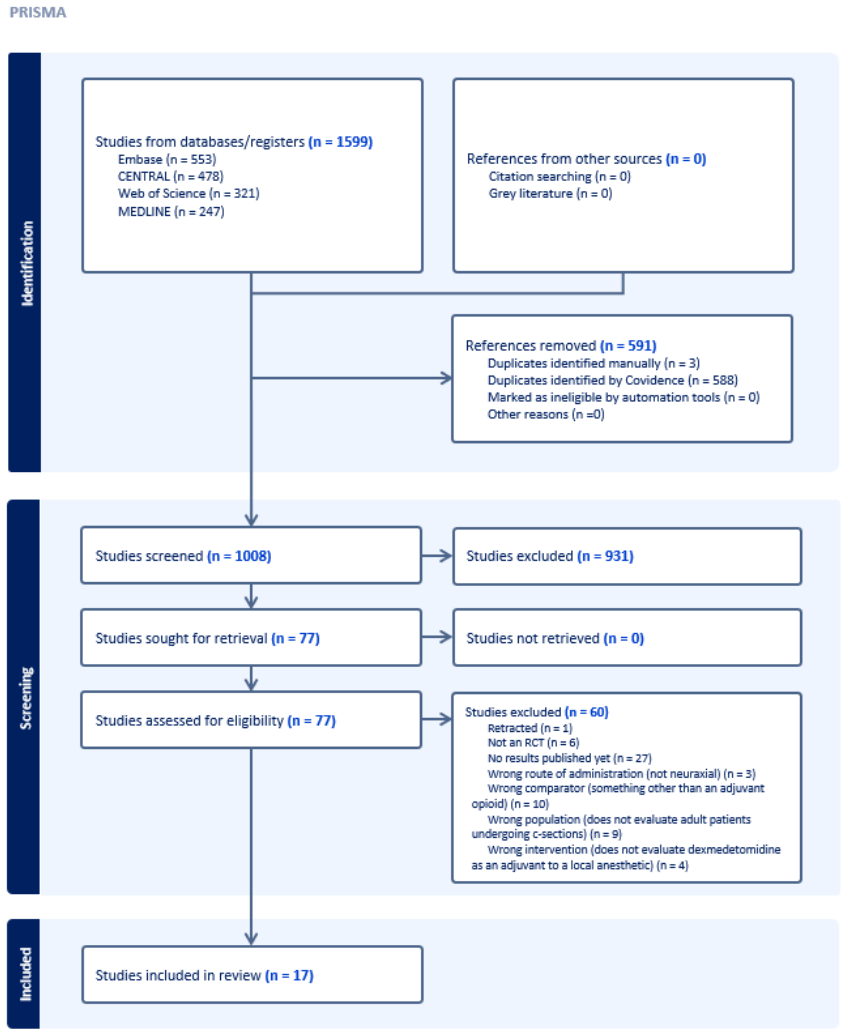
- Perioperative pain management for c-sections can be supplemented by adjuvant neuraxial opioids. However, opioids are not desirable for all patients, especially those with opioid use disorder or allergy.
- Meanwhile, dexmedetomidine is a highly specific and selective α2 agonist that is considered a safe and effective adjuvant.
- Currently, there is a need for a comprehensive systematic review that compares these medications in this setting but does not limit itself to either one opioid or a preidentified dose combination of adjuvant and local anesthetic.
- Objective: To better the inform indications for dexmedetomidine by comparing its efficacy and adverse effects to opioids across dosing ranges in the setting of c-sections.

Study Design and Methods

- A systematic review was conducted based on a search of Embase, CENTRAL, Web of Science, and MEDLINE on 08/29/24
- Only RCTs that compared dexmedetomidine to opioids as neuraxial adjuvants during c-sections were eligible for inclusion with no restriction on local anesthetic, time of administration of adjuvant, or dosing.
- Two reviewers independently evaluated each article for abstract/full text screening, data extraction, and risk of bias. Conflicts were resolved by a third reviewer or mutual consensus.
- Outcomes for this study were pain outcomes, sedation levels, onset/duration of motor/sensory block, and adverse effects.
- A p-value of <0.05 reported in studies represented statistical significance when comparing results.



Results Chart

Comparing Dexmedetomidine to Opioids as Neuraxial Adjuvants to Local Anesthetics for Perioperative Pain Management During C-sections: A Systematic Review of Randomized Controlled Trials

Route, Dose, and Author	Patients in each wing	Local	Pain score	Duration of analgesia/sensory block (difference)	Sedation Level[2]	Motor block duration[2] (difference)	Onset of sensory block[2] (difference)	Onset of motor block[2] (difference)	Hypotension	Bradycardia	Nausea and Vomiting	Shivering	Puritis	Resp Depression
Intrathecal														
Dex 2.5µg vs Sufentanil 5µg														
Jarahzadeh 2023	30, 30	Bup		(+132.3 min)		(+168.8 min)	(+2.4 min)							
Dex 5µg vs Sufentanil 5µg														
Amini-Saman 2023	30, 30	Bup												
Dex 5µg vs Fent 10µg														
Urooj 2022	30, 30	Bup		(+50.7 min)		(+70.9 min)	(+1.28 min)				V only			
Dex 5µg vs Fent 15µg														
Li 2014	21,21	Bup		(+44.7 min)			(-0.3 min)							
Dex 5µg vs Fent 25µg														
Iqbal 2021	30, 30	Levobup		(+35.34 min)		(+33.9 min)	(+1.29 min)	(+0.91 min)						
Khosravi 2020	55,55	Bup		(+155.5 min)			(-0.2 min)							
Rajkumar 2022	33,33	Bup		(+167.4 min)			(-0.144 min)							
Rastogi 2020	20,20	Levobup		(+31.75 min)		(+61.2 min)	(+1.14 min)	(+0.96 min)						
Soudagar 2024	50,50	Levobup		(+85.01 min)			(-0.89 min)	(+0.93 min)						
Zafar 2021	40,40	Levobup		(+84.97 min)		(+62.1 min)	(-0.89 min)	(+0.98 min)						
Dex 10µg vs Fent 10µg														
Tsaroucha	20,20	Rop		(+44.25 min)		(+39 min)								
Dex 10µg vs Fent 20µg														
Li 2020	100,100	Bup		(+26.2 min)		(+35.4 min)		(-0.2 min)						
Dex 10µg vs Fent 25µg														
Sun 2014	30,30	Bup		(+32.73 min)										
Dex 5µg vs Morph 0.1mg														
Qi 2016	40,39	Bup		(+60.71 min)		(+64.9 min)	(-1.36 min)	(-1.08 min)						
Dex 5µg vs Morph 0.15mg														
Rajkumar 2022	33,33	Bup		(+134 min)			(-0.135 min)							
Dex 5µg vs Meper 10 mg														
Azemati 2022	30,30	Bup		(+42.77 min)		(+38 min)								
Post-op PCEA														
Dex vs Morph – dosing same in each study[3]														
Kong 2018[3]	21,21	Rop												
Mo 2017[3]	40,40	Rop												

Key

Dex Superior[1] | Opioid Superior[1] | No Difference[1] | Not Studied | Not reported

Duration of analgesia (+44.7 min) means dex duration +44.7 min longer and superior

Motor block duration (+168.8 min) means dex duration +168.8 min longer and inferior

Onset of sensory block (-0.2 min) means dex shorter and superior

Onset of sensory block (+1.14 min) means dex is longer and inferior

[1]Based on study reported p-value of <0.05

[2]Longer motor block for dex coded as inferior, higher sedation score for dex coded as inferior, shorter onset for dex coded as superior, and longer onset for dex coded as inferior

[3]PCEA Dosing **Dex:** Loading dose 0.1 mcg/kg Dex - Continuous 2mL/hr of Rop 0.15% + dex 1mcg/kg in NS for 100 mL - PCEA 0.5 ml bolus of continuous mixture w/15 min lockout over 48 hr

[3]PCEA Dosing **Morphine:** Loading dose 2 mg Morphine - Continuous 2mL/hr Rop 0.15% + morphine 5 mg in NS for 100 mL - PCEA 0.5mL bolus of continuous mixture w/15 min lockout over 48 hr

Conclusion & Discussion

- Neuraxial dexmedetomidine offers comparable-to-superior perioperative pain control vs SOAP-guideline-dosed fentanyl, sufentanil, morphine, or meperidine as c-section adjuvants.
- Its most common adverse effect is prolonged motor block.
- Therefore, given this combination of findings, intrathecal adjuvant dexmedetomidine at the commonly used dosing range of 2.5-5µg is a reasonable alternative in cases of:
  - Contraindications to opioids **or**
  - Scenarios where surgery duration is expected to be prolonged. For example, pre-planned further surgical interventions such as tubal ligation.