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Perineural Dexmedetomidine as an Adjuvant to Thoracic Paravertebral Block for Postoperative Analgesia in Thoracic Surgery: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

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INTRODUCTION

Evidence on the efficacy and safety of perineural dexmedetomidine as an adjunct to thoracic paravertebral block (TPVB) in thoracic surgery remains limited. This systematic review and meta-analysis evaluated its effects on postoperative opioid consumption, pain outcomes and adverse events.

METHODS

- Databases: PubMed, Embase and CENTRAL, searched through April 25, 2026.
- Eligibility: RCTs in adult patients undergoing thoracic surgery, including video-assisted thoracoscopic surgery (VATS) or open thoracotomy
- Comparison: TPVB with perineural dexmedetomidine plus local anesthetic versus local anesthetics alone
- Risk of Bias: Cochrane RoB 2; Certainty of evidence: GRADE
- Primary outcome: 24-hour postoperative opioid consumption, expressed as morphine milligram equivalents (MME)
- Secondary outcomes: Pain scores at rest and during movement or cough at 12 and 24 hours, time to first analgesic request, and adverse events

RESULTS

- Lower 24-hour opioid consumption compared with TPVB alone
- Lower VAS pain scores at 12 and 24 hours, both at rest and during movement/cough
- No statistically significant differences in NRS pain scores at rest at 12 and 24 hours
- Longer time to first analgesic request
- Increased risk of bradycardia
- No statistically significant differences in hypotension, nausea or vomiting

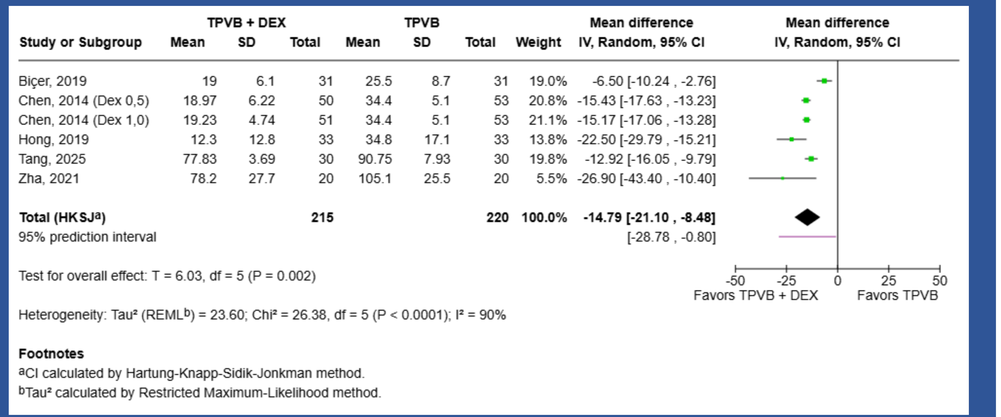
Adding perineural dexmedetomidine to TPVB reduced opioid consumption after thoracic surgery, but increased bradycardia risk.

10 Randomized Trials included - 692 patients

Outcome	Pooled effect (95% CI)	I^2
24-hour opioid consumption	MD -14.79 mg MME, (-21.10 to -8.48)	90%
Time to first analgesic request	MD +9.53 h, (0.35 to 18.71)	99%
Pain VAS at 12 hours at rest	MD −1.09, (−1.37 to −0.81)	89%
Pain VAS at 12 hours at movement/ cough	MD −1.36, (−1.81 to −0.90)	96%
Pain VAS at 24h at rest	MD −0.91, (−1.64 to −0.18)	98%
Pain VAS at 24h at movement/ cough	MD −1.04, (−1.84 to −0.25)	99%
Hypotension	RR 1.01, (0.49 to 2.08)	0%
Bradycardia	RR 2.29, (1.10 to 4.77)	0%

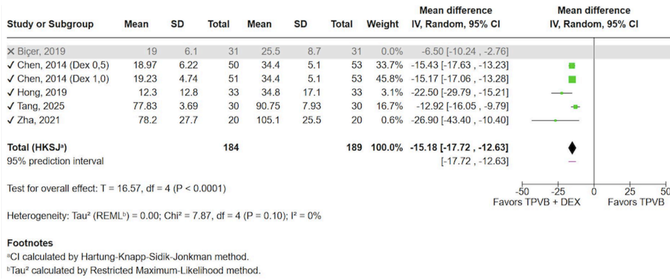
MD: mean difference. RR: risk ratio. CI: confidence interval. MME: morphine milligram equivalents. VAS: visual analog scale. I^2: heterogeneity.

24-hour opioid consumption



SENSITIVITY ANALYSIS

- Excluding Biçer et al. reduced heterogeneity to I^2 = 0%, while the reduction in 24-hour opioid consumption remained significant.



DISCUSSION

- High heterogeneity and variation in dexmedetomidine doses and local anesthetic concentrations limit the generalizability of the findings
- Analgesic benefits should be weighed against the increased risk of bradycardia

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