

Impact of regional thoracic nerve blocks on postoperative delirium or postoperative cognitive performance on elderly patients undergoing non-cardiac thoracic surgery: a Systematic Review and Meta-Analysis

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INTRODUCTION

Regional thoracic nerve blocks (RTNB) may provide **neuroprotective benefits** beyond pain control, as shown for other regional techniques and surgeries.

Postoperative delirium (POD) and cognitive dysfunction (POCD) are common in older surgical patients and are associated with long-term cognitive decline, functional decline, and nursing home placement.

This meta-analysis evaluated **regional thoracic nerve blocks plus general anesthesia** versus **general anesthesia alone** on postoperative neurocognitive outcomes in elderly thoracic surgery patients.

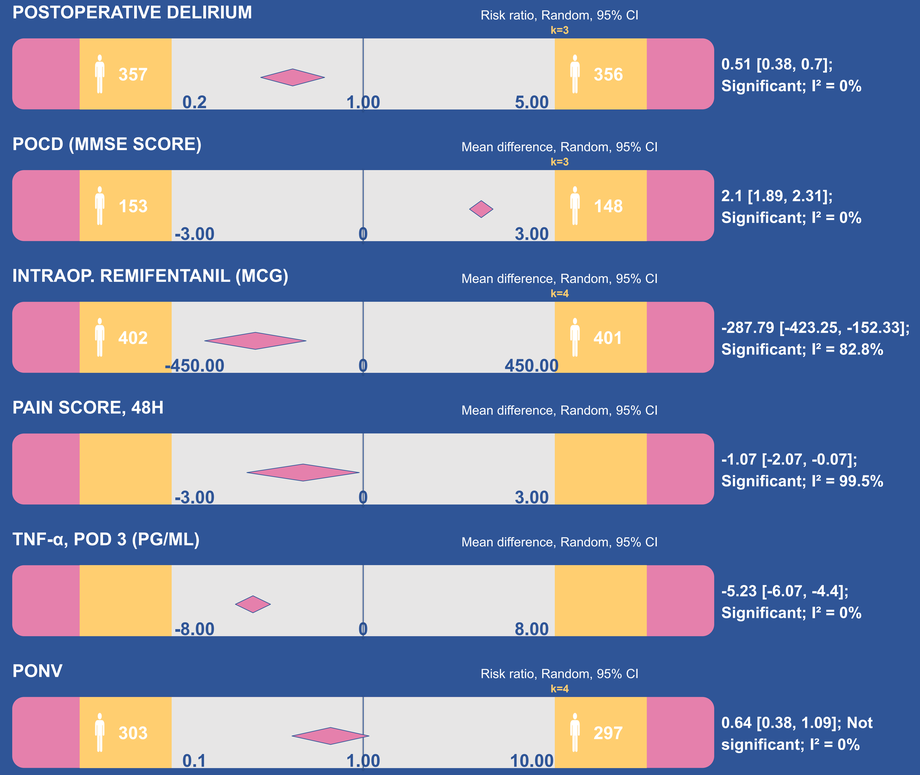
MATERIALS AND METHODS

- Searched PubMed, Embase, and Cochrane CENTRAL
- **RCTs, plus one observational study meeting eligibility**
- **Inclusion:** RTNB + general anesthesia vs. general anesthesia alone in adults ≥ 60 years undergoing non-cardiac thoracic surgery
- **Primary outcomes:** POD (CAM, 3D-CAM, or Nu-DESC) and POCD (MMSE)
- **Random-effects models** for risk ratios (RR) and mean differences (MD) in R Studio; heterogeneity via **I^2 and Tau^2**.
- **Risk of bias** assessed with Cochrane RoB2 (RCTs) and ROBINS-I (observational studies).
- **Publicly available, de-identified aggregate data**; met institutional criteria for IRB exemption.

RTNB cut postoperative delirium risk by 49% and improved cognitive recovery in elderly thoracic surgery patients.

1,094 records identified
10 reports assessed for eligibility
6 studies included

1,014 patients
RTNB + GA vs. GA alone



RESULTS

- **Study Selection:**
- **1,094 records identified** (PubMed 200, Embase 525, Cochrane CENTRAL 369); 57 duplicates removed, leaving 1,037 records screened.
- **1,010 excluded at screening**; of 27 reports sought, 17 not retrieved; of 10 assessed for eligibility, 4 excluded, leaving **5 RCTs and 1 observational study** (1,014 patients).
- **Outcomes:**
- **RTNB cut POD incidence by 49%** (RR 0.51 [0.38, 0.70], I^2 = 0%) and **improved postoperative MMSE scores** (MD 2.10 [1.89, 2.31], I^2 = 0%).
- **Secondary endpoints:** reduced intraoperative remifentanil consumption (MD −287.79 mcg [−423.25, −152.33], I^2 = 82.8%), lower pain scores at 48h (MD −1.07 [−2.07, −0.07], I^2 = 99.5%), and lower TNF-α on postoperative day 3 (MD −5.23 pg/mL [−6.07, −4.40], I^2 = 0%).
- PONV reduction was not significant (RR 0.64 [0.38, 1.09], I^2 = 0%).

DISCUSSION

RTNBs reduce POD and improve postoperative cognitive function in older adults undergoing non-cardiac thoracic surgery, supporting **wider adoption within multimodal anesthesia** for this high-risk population. Secondary outcomes showed substantial heterogeneity from clinical and methodological variation and require cautious interpretation. Evidence on postoperative inflammatory biomarkers — a key factor in POD/POCD pathophysiology — remains limited, marking a critical target for larger, standardized trials to confirm these primary findings.

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