

Higher Acute Postoperative Pain Intensity May be Associated with the Occurrence of Postoperative Delirium after Non-cardiac Surgery



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Background

- Postoperative delirium (POD) is common; incidence of 7-26% after non-cardiac surgery
- Surgery can lead to significant pain
- Association between postsurgical pain and POD has not been investigated
- This is a systematic review of observational studies evaluating post-surgical pain and POD



Methods

- Ethics approval is not applicable
- Prospero registration:** CRD42021192105 and published
- Database search:** MEDLINE, EMBASE, Cochrane, CINAHL, and PSYCHINFO up to May/2023
- Study selection:** cohort, case-control and cross-sectional studies, any language
- Population: Adults undergoing elective or non-elective non-cardiac
- Exposure: Acute postsurgical pain (up to 7-10 days postoperatively)
- Outcomes: Diagnosis of POD assessed by a validated tool
- Screening and data extraction:** Independently by pairs of reviewers
- Risk of bias assessment**
- CLARITY risk of bias tool: cohort and case-control studies
- Joanna Briggs Institute critical appraisal checklist: cross-sectional studies
- Certainty of evidence assessment**
- Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach, minimally-contextualized
- Data analysis**
- Where possible, we conducted random effects dose-response meta-analyses (DRMA) to estimate the risk of the outcome per unit of pain intensity
- To evaluate the association between acute postoperative pain and the risk of developing POD, secondary analysis included studies which indicated that the measurement of exposure preceded the outcome assessment

Results

- 20 studies (19 cohort and 1 cross sectional), >7000 participants
- Overall incidence of POD: 13.2%
- Figure 1 shows overall risk of bias rating

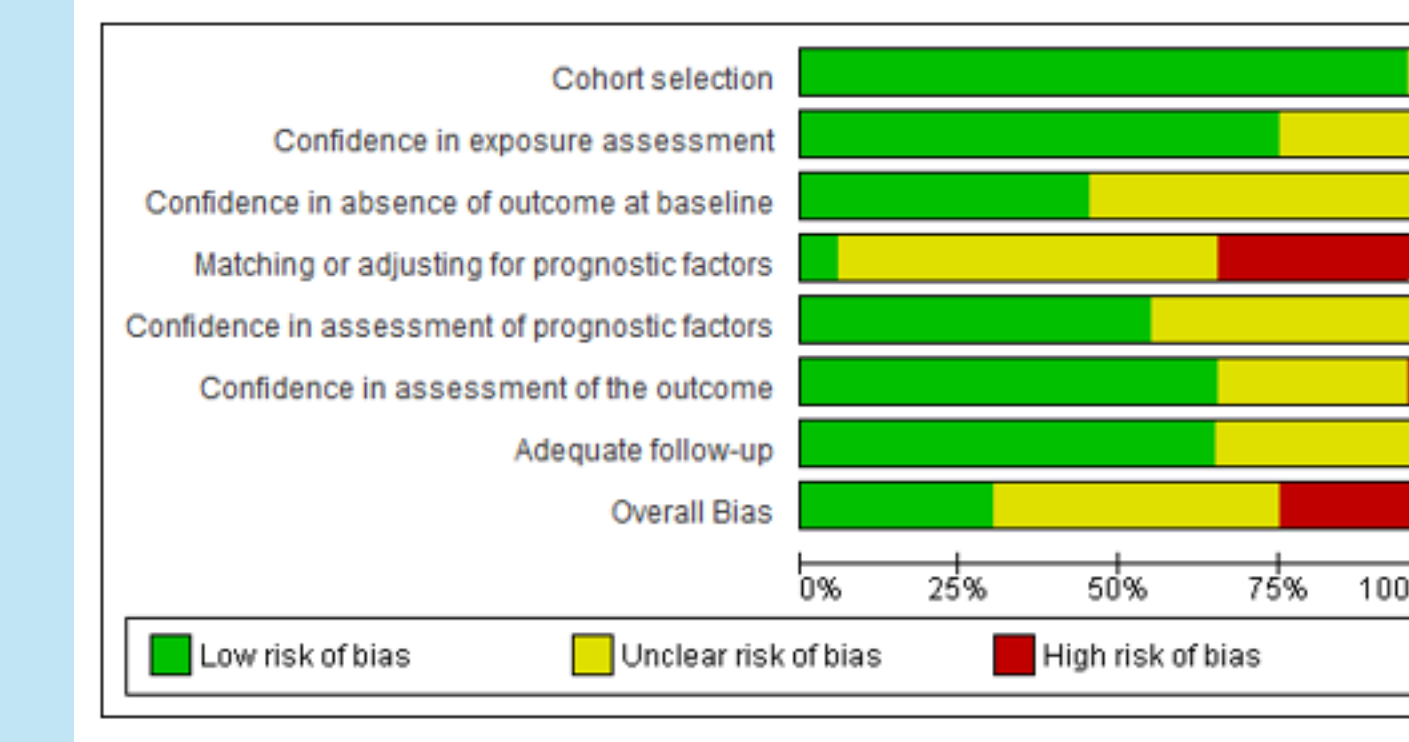


Figure 1: Risk of bias rating by domain as a percentage of studies

- Pooling data from 13 studies (n=6098) in DRMA (Figure 2)
- adjusted relative risk [aRR]/unit of pain intensity: 1.26, 95% confidence interval [CI]:1.17-1.35, large effect,
- Low certainty of evidence (rated ↓ for serious risk of bias, rated ↑ for large effect and dose-dependent association)
- Data from 7 other studies (n=1066) could not be included in the meta-analysis
- 5 studies (n=824) found an association and 2 studies (n=242) found no association between pain and POD

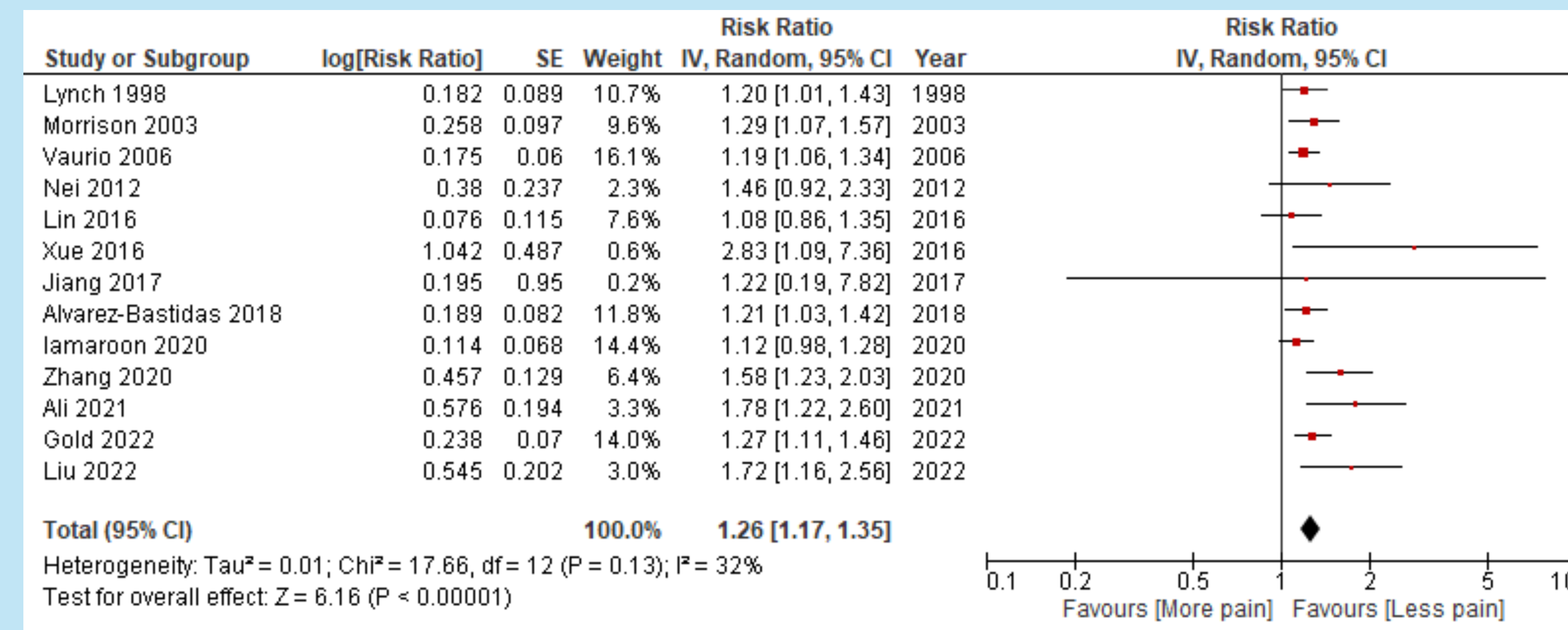


Figure 2: Forest plot of the random effects model inverse variance meta-analysis of the association between postoperative pain intensity and the incidence of POD

- Secondary analysis:**
- 3 studies (n=1237) indicated pain assessment preceded POD diagnosis
- aRR for the risk of POD/unit of pain intensity: 1.18 (95% CI:1.08-1.30)
- Low certainty of evidence, rated ↓ for risk of bias, imprecision, and publication bias and rated ↑ for dose-dependent association)

Discussion

- First systematic review to summarize evidence on the relationship between acute postoperative pain and POD
- There is **low certainty** of evidence that there is a dose-dependent association between postoperative pain and POD, (each unit increase in pain intensity → large increase in the occurrence of POD)
- The evidence that pain is associated with increased risk of developing POD of **low certainty**
- Strengths:**
- Protocol: registered, and published
- Comprehensive search strategy
- Findings are generalizable to non-cardiac surgery patients
- Limitations:**
- Substantial methodological variability between studies
- Residual confounding inherent to observational studies

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