

# INPLASY

## Individualized PEEP titrated by respiratory system compliance during one-lung ventilation: a systematic review and meta-analysis

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### ADMINISTRATIVE INFORMATION

**Support** - None.

**Review Stage at time of this submission** - Preliminary searches.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202430124

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 March 2024 and was last updated on 28 March 2024.

### INTRODUCTION

**Review question / Objective** Individualized PEEP titrated by respiratory system compliance during one-lung ventilation.

**Condition being studied** Positive end-expiratory pressure; lung compliance; one-lung ventilation; thoracic surgery; postoperative pulmonary complications; respiratory system mechanics.

### METHODS

**Search strategy** Search strategy used a combination of keywords and medical subject heading terms related to positive end-expiratory pressure, lung compliance, one-lung ventilation, and thoracic surgery.

**Participant or population** Adult patients undergoing surgery, regardless of surgical type (including emergent or elective cardiothoracic and non-cardiothoracic surgery).

**Intervention** Driving pressure-guided ventilation, involving low tide volume, titrated PEEP, and with or without recruitment maneuver.

**Comparator** Conventional protective ventilation, involving low tide volume, fixed PEEP, and with or without recruitment maneuver.

**Study designs to be included** Randomized controlled trials.

**Eligibility criteria** (1) Population: adult patients undergoing thoracic surgery with one-lung ventilation; (2) Intervention: individualized PEEP titrated by respiratory system compliance, low tidal volume, and with or without recruitment maneuver; (3) Comparison: fixed PEEP, low tidal volume, and with or without recruitment maneuver; and (4) Design: RCTs.

**Information sources** PubMed, Embase, and the Cochrane Central Register of Controlled Trials.

**Main outcome(s)** Postoperative pulmonary complications, pneumonia, atelectasis.

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**Additional outcome(s)** Clinical outcomes: ARDS, cardiovascular complications, mortality, length of ICU stay, length of hospital stay. Respiratory mechanics: dynamic compliance, driving pressure, peak pressure, plateau pressure. Gas exchanges: PaO<sub>2</sub>, PaCO<sub>2</sub>, PaO<sub>2</sub>/FiO<sub>2</sub>. Hemodynamic parameters: heart rate, mean arterial pressure.

**Data management** We extracted the following information, including study characteristics (last name of the first author, year of publication, and country where the study was conducted), study population (age, body mass index, American Society of Anesthesiologist physical status, number of patients, and surgical procedure), ventilation parameters (tidal volume, PEEP, recruitment maneuver, respiratory rate, mode of ventilation, inspired fraction of oxygen, inspiratory/expiratory ratio, and end-tidal carbon dioxide), and study outcomes (definition and assessment timepoint).

**Quality assessment / Risk of bias analysis** Two reviewers independently assessed the risk of bias using the Cochrane risk of bias assessment tool 2 (RoB 2).

**Strategy of data synthesis** For dichotomous outcome data, we calculated risk ratios (RRs) and 95% confidence intervals (CIs). For continuous outcome data, we calculated mean differences (MDs) with 95% CIs. Given clinical heterogeneity, we employed a random-effects model to pool the data. The results of the meta-analyses were visually depicted through forest plots. To assess statistical heterogeneity across studies, Cochran's Q test was applied, and heterogeneity was quantified using the I<sup>2</sup> statistic. An I<sup>2</sup> value exceeding 50% indicated substantial statistical heterogeneity. Publication bias was evaluated by visually inspecting funnel plots and conducting the Egger test. All statistical analyses were conducted using Review Manager software (RevMan version 5.4.1; Nordic Cochrane Centre, Cochrane Collaboration). All tests were two-tailed, and statistical significance was set at P < 0.05.

**Subgroup analysis** Subgroup analyses for postoperative pulmonary complications, pneumonia, and atelectasis were carried out based on titration methods (dynamic compliance versus driving pressure or static compliance, stepwise decremental versus incremental PEEP).

**Sensitivity analysis** None.

**Language restriction** None.

**Country(ies) involved** China.

**Keywords** riving pressure; mechanical ventilation; surgery; postoperative pulmonary complications; meta-analysis.

**Dissemination plans** Publish the work in a peer-reviewed journal.

**Contributions of each author**

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