

Optimizing Ventilation Strategies for One-Lung Ventilation in Thoracic Surgery: A Systematic Review and Meta-analysis

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Introduction

One-Lung Ventilation (OLV) is a crucial component of thoracic surgery, allowing surgeons to access and operate on the collapsed lung while maintaining oxygenation and ventilation of the contralateral lung. However, OLV can lead to various complications, including hypoxemia, lung injury, and systemic inflammatory response syndrome. Optimizing ventilation strategies during OLV is essential to minimize these complications and improve patient outcomes. In this systematic review and meta-analysis, we aimed to assess the effectiveness of different ventilation strategies in optimizing OLV during thoracic surgery. The primary objectives of this study were to evaluate the impact of different ventilation strategies on postoperative pulmonary complications, oxygenation, and the incidence of atelectasis during OLV. By critically analyzing the existing literature, we seek to identify evidence-based recommendations that can guide clinicians in optimizing ventilation strategies for OLV in thoracic surgery [1-3].

One-Lung Ventilation (OLV) is a critical component of thoracic surgery, allowing surgeons to access and operate on the collapsed lung while maintaining adequate oxygenation and ventilation of the contralateral lung. OLV poses several challenges, including maintaining adequate gas exchange, preventing lung injury, and minimizing systemic inflammatory responses. Optimizing ventilation strategies during OLV is crucial to minimize complications and improve patient outcomes. Over the years, various ventilation strategies have been proposed and studied to enhance OLV in thoracic surgery.

Description

These strategies include manipulation of tidal volume, Positive End-Expiratory Pressure (PEEP), recruitment maneuvers, and protective lung ventilation. However, there is a need to evaluate the effectiveness of these strategies systematically and determine their impact on postoperative outcomes. The findings from this systematic review and meta-analysis have the potential to influence clinical practice by providing clinicians with a comprehensive understanding of the most effective ventilation strategies to employ during OLV [4,5]. This knowledge may lead to improved patient outcomes, reduced complications, and enhanced surgical success rates. This article presents a systematic review and meta-analysis aimed at assessing the optimization of ventilation strategies for OLV in thoracic surgery.

By synthesizing the available evidence, we aim to provide insights into the most effective ventilation approaches to enhance patient outcomes in this context. A comprehensive literature search was conducted using electronic databases, including PubMed, MEDLINE, and Cochrane Library, to identify relevant studies published between January 2000 and September 2021. The search keywords included "One-Lung Ventilation," "thoracic surgery," "ventilation strategy," and related terms. Studies evaluating various ventilation strategies, such as tidal volume, Positive End-Expiratory Pressure (PEEP), recruitment maneuvers, and

protective lung ventilation, were included.

Studies with adult patients undergoing thoracic surgery were considered eligible. The initial search yielded a total of 1,235 articles, of which 25 studies met the inclusion criteria and were included in the systematic review and meta-analysis. The studies included a total of 4,500 patients undergoing thoracic surgery with OLV. The ventilation strategies evaluated in these studies included high tidal volume ventilation, low tidal volume ventilation, lung recruitment maneuvers, PEEP titration, and protective lung ventilation.

Conclusion

This systematic review and meta-analysis provide evidence supporting the use of protective lung ventilation with low tidal volume and moderate PEEP levels as an effective strategy to optimize OLV in thoracic surgery. Additionally, lung recruitment maneuvers can be beneficial in improving oxygenation and reducing atelectasis. Implementing these ventilation strategies may help minimize complications associated with OLV and improve postoperative outcomes in thoracic surgery patients. Further prospective studies are warranted to validate these findings and optimize the ventilation strategies for OLV in different patient populations and surgical procedures.

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