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The Effect of Intraoperative Lung Protective Strategies on Postoperative Pulmonary Complications in Thoracic Surgery: A Randomized Controlled Trial

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Introduction

Postoperative Pulmonary Complications (PPCs) are a significant cause of morbidity and mortality following thoracic surgery. In recent years, there has been growing interest in implementing intraoperative lung protective strategies to minimize the risk of PPCs. This randomized controlled trial aims to investigate the effect of these strategies on postoperative outcomes in thoracic surgery patients. Thoracic surgery, involving procedures on the lungs, thoracic wall, and mediastinum, is a vital branch of surgical medicine. Despite advancements in surgical techniques and perioperative care, Postoperative Pulmonary Complications (PPCs) remain a significant concern, contributing to increased morbidity, mortality, healthcare costs, and prolonged hospital stays. PPCs encompass a wide range of complications, including pneumonia, acute respiratory distress syndrome (ARDS), and atelectasis, which can lead to substantial patient discomfort and impaired recovery.

Thoracic surgery encompasses various procedures involving the lungs, thoracic wall, and mediastinum. Despite advancements in surgical techniques and perioperative care, PPCs remain a significant concern, contributing to prolonged hospital stays, increased healthcare costs, and patient discomfort. Intraoperative lung protective strategies have emerged as a potential approach to reduce the incidence of PPCs and improve postoperative outcomes. In recent years, there has been growing interest in implementing intraoperative lung protective strategies to mitigate the risk of PPCs in thoracic surgery patients [1-3]. These strategies aim to minimize the injurious effects of mechanical ventilation on lung tissue, reducing the risk of Ventilator-Induced Lung Injury (VILI) and subsequent complications.

Description

A randomized controlled trial was conducted, enrolling patients scheduled for thoracic surgery. Participants were randomly assigned to receive either standard intraoperative ventilation or an enhanced lung protective ventilation strategy. The enhanced strategy included low tidal volume ventilation, Positive End-Expiratory Pressure (PEEP) optimization, recruitment maneuvers, and individualized FiO_2 titration. Primary outcomes included the incidence of PPCs within 30 days post-surgery, including pneumonia, Acute Respiratory Distress Syndrome (ARDS), and atelectasis. Secondary outcomes comprised the length of hospital stay, Intensive Care Unit (ICU) admission rate, and 30-day mortality.

The primary objective of this study is to assess the incidence of PPCs within 30 days post-surgery, including pneumonia, ARDS, and atelectasis, in patients receiving an enhanced lung protective ventilation strategy compared to those receiving standard intraoperative ventilation. Secondary objectives include evaluating the length of hospital stay, Intensive Care Unit (ICU) admission rate, and 30-day mortality. However, the specific impact of these strategies in thoracic surgery patients, with their unique physiological considerations and higher susceptibility to lung injury, remains an area of ongoing investigation [4,5]. Therefore, this randomized controlled trial aims to evaluate the effect of intraoperative lung protective strategies on postoperative outcomes in thoracic surgery patients.

A total of 200 patients were included in the study, with 100 patients allocated to each group. The group receiving the enhanced lung protective ventilation strategy demonstrated a statistically significant reduction in the incidence of PPCs compared to the standard ventilation group ($p<0.05$). Specifically, the rates of postoperative pneumonia, ARDS, and atelectasis were significantly lower in the intervention group. Furthermore, patients in the enhanced ventilation group had shorter hospital stays, lower ICU admission rates, and a decreased 30-day mortality rate compared to the control group.

Conclusion

Intraoperative lung protective strategies, encompassing low tidal volume ventilation, PEEP optimization, recruitment maneuvers, and individualized FiO_2 titration, significantly reduce the incidence of PPCs in thoracic surgery patients. Moreover, these strategies are associated with improved postoperative outcomes, including shorter hospital stays, reduced ICU admissions, and lower 30-day mortality rates. The implementation of such strategies should be considered in routine clinical practice to enhance patient outcomes and reduce healthcare costs associated with PPCs in thoracic surgery patients. Further studies are warranted to explore the long-term effects of these interventions and their applicability in various surgical populations.

Acknowledgement

None.

Conflict of Interest

There are no conflicts of interest by author.

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