Volume 3, Issue 4, 2025

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

INCIDENCE OF POST OPERATIVE PULMONARY COMPLICATIONS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE UNDERGOING SPINE SURGERY UNDER GENERAL ANAESTHESIA: LUNG PROTECTIVE VENTILATION VS STANDARD MECHANICAL VENTILATION

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DOI: https://doi.org/10.5281/zenodo.17540046

Keywords
COPD, SMV, LPV

Article History
Received on 04 May 2025
Accepted on 04 June 2025
Published on 12 June 2025

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Abstract

INTRODUCTION: *Choice of lung protective versus standard mechanical ventilation, remains subject of debate in COPD patients. So, this review aimed to compare the incidence of post operative pulmonary complications in patients with COPD undergoing spine surgery under general anesthesia with LPV versus SMV.*

OBJECTIVE: *To compare the incidence of post-operative pulmonary complications using lung protective ventilation and standard mechanical ventilation in patients with COPD undergoing spine surgery under general anesthesia.*

METHODOLOGY: *This RCT has included 80 COPD patients undergoing spine surgery at Mayo Hospital, Lahore. Patients were randomly assigned using lottery method to group A (LPV) and group B (SMV). Standard pre-induction, induction, and maintenance anesthesia protocols were followed in both groups. ABGs were checked after 2 hours of ventilation. Postoperatively, patients were monitored in PACU. Supplemental oxygen and noninvasive measures were provided as needed. Incidence of Post operative pulmonary complications were recorded. Data analysis was performed using SPSS v26. Chi-square tests were used to compare incidence of Post operative pulmonary complications between groups, with significance threshold of $p \leq 0.05$.*

RESULTS: *In group A less patients developed Post operative pulmonary complications as compared to group B i.e. 5(87.5%) vs 13(32.5%), p=0.03. Group A patients had utilized supplemental oxygen less vs group B i.e. 7.5% vs 27.5% (p=0.01), NRM 2.5% vs 15% (p=0.04), and CPAP 2.5% vs 12.5% (p=0.08). Group A vs B excessive cough; 5% vs 25% (p=0.01), 2.5% vs 17.5% (p=0.02) bronchospasm, and 2.5% vs 7% (p=0.30) atelectasis. Data stratification with respect to age, female gender and duration of surgery found to be insignificant $p>0.05$. Data stratification with respect to male gender (p=0.02) and smoking (0.05) found to be significant $p<0.05$.*

CONCLUSION: *It is concluded that, LPV may significantly reduce the incidence of post-operative pulmonary complications as compared to standard*

mechanical ventilation in patients with COPD undergoing spine surgery under general anesthesia.

INTRODUCTION

Term "postoperative pulmonary complications" (Post operative pulmonary complications) refers to group of respiratory problems that develop after surgery and anaesthesia. Post operative pulmonary complications are especially dangerous for patients with chronic obstructive pulmonary disease, which is characterised by restricted airflow and compromised lung function.[1] Bronchospasm, hypoxemia, atelectasis, pulmonary infection, respiratory failure, and aggravation of long-term lung disorders are few examples of these consequences. 1% to 23% of major surgical procedures have Post operative pulmonary complications.[2] According to related mortality risk, Post operative pulmonary complications are classified as major or mild. Remarkably, atelectasis might occur in up to 90% of patients at some point under GA.

Changes in tracheal wall's structural makeup brought on by COPD may result in blockage, poor lung ventilation, and carbon dioxide retention. Reduced vital capacity, functional residual capacity, and lung compliance in both the static and dynamic states follow.[3] Risk factors for Post operative pulmonary complications include both procedure- and patient-related factors, such as advanced age and pulmonary function, as well as anaesthetic techniques and duration of surgery.[4]

Process of doing spine surgery is intricate, careful, and time-consuming. Following spine procedures, postop pulmonary problems are frequent and can result in longer hospital admissions, higher rates of morbidity, and even death. Usually, invasive mechanical breathing is used during these surgeries, which are carried out under general anaesthesia.[5] Risks associated with mechanical breathing include aspiration, barotrauma, intraoperative hemodynamic instability, and postoperative pulmonary problems. Use of traditional mechanical breathing systems required for these neurosurgery procedures is root cause of many of these problems.[6] When having spine surgery, patients are frequently positioned in prone position, which compresses IVC, raises intra-abdominal pressure, and decreases lung compliance.[7]

Quitting smoking, implementing intraoperative protective breathing techniques, and optimising comorbidities prior to surgery are preventive approaches that can lower the risk of postoperative pulmonary problems. Low tidal volumes and particular PEEP are used in lung protection ventilation, which may or may not include lung recruitment manoeuvres.[8] Patients undergoing neurosurgery who received LPV had decreased occurrence of postop pulmonary problems, according to Longhini et al. research. In contrast to 33.33% patients in standard mechanical ventilation (SMV) group, only 6.6% patients in LPV group needed additional oxygen therapy.[9]

Studies on open abdominal surgery have demonstrated improvements in pulmonary mechanics during and after procedure. In one RCT with patients undergoing open abdominal surgery, it was discovered that older patients receiving intraoperative lung protective ventilation had 21% reduction in airway resistance and 32% increase in compliance when compared to those receiving conventional ventilation ($P<0.001$ and $P=0.029$, respectively).[10] Patients who had anaesthesia for longer than three hours responded particularly well to low tidal volume breathing ($p = 0.004$). One multivariate analysis indicated lower risk of Post operative pulmonary complications with low tidal volume ventilation across various subgroups. Tidal volume was marginally significantly associated with risk of postoperative pulmonary complications within subgroup of patients with mild to moderate airflow limitation ($p = 0.078$).[11]

Spine surgery patients have often been excluded from most trials on protective intraoperative ventilation due to concerns that using low tidal volume during LPV might result in hypercapnia, which can have detrimental effects on cerebrovascular physiology. However, LPV in spine surgery, especially for patients with COPD, may prevent postoperative pulmonary complications, leading to improved oxygenation and stable lung function. Additionally, lung protective ventilation may influence airway pressures, potentially impacting

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ISSN: (e) 3007-1607 (p) 3007-1593

lung mechanics in COPD patients. Therefore, we have conducted this study at Mayo Hospital Lahore, focused on spine surgeries in COPD patients. This research aimed to positively impact the field of anaesthesia and perioperative care, potentially reducing hospital stays.

Patient-related risk factors

Traditional patient-related risk factors for Post operative pulmonary complications include functional limitations, 60 years of age, ASA category of 2 or higher, low albumin, current smoking status, and existence of CHF or COPD. Age is most important predictor among patient-related risk variables.[1] Another serious risk factor is smoking, which has an impact on blood clotting, CVS, and respiratory system. Therefore, determining patient's estimated tobacco consumption is essential, even in people who do not exhibit symptoms, 20 or more pack-years may suggest the onset of small airway involvement and airflow constraints. Substantial history of smoking should lead medical professionals to suspect COPD and its related pulmonary and cardiac disorders, even if spirometry results are normal. Use of other inhaled tobacco products and exposure to second-hand smoke can produce effects similar to those of cigarettes, necessitating thorough patient history.[12]

Smoking raises, risk of thrombosis via increasing Hb concentrations and platelet aggregation. Preoperative smoking has been associated with increased risks of morbidity, wound complications, infections, respiratory/neurological problems, and ICU admissions following surgery. Smoking cessation before elective surgery can reduce the risk of Post operative pulmonary complications, while best time to stop is still up for debate. Trials found that quitting smoking at least 3–4 weeks prior to surgery lowers respiratory and wound-healing issues, in contrast to other recent evidence suggesting that quitting few weeks prior to surgery can affect clinical outcomes.[13]

Intraoperative risk factors

Anaesthesia and surgical parameters are linked to additional PPC risk factors. ANS and breathing can both be weakened by sedatives and other medications used to induce and sustain anaesthesia. Research has indicated that patients under GA are more likely to experience unanticipated postop intubation, prolonged ventilator reliance, and postop pneumonia.[14]

Procedures lasting longer, thoracic or abdominal surgery, neurosurgery, head and neck surgery, vascular surgery, emergency operations, use of GA, and nonselective nasogastric tube implantation are among the surgical risk factors associated with Post operative pulmonary complications. Transfusions involving more than four units of RBCs further raise the risk of Post operative pulmonary complications.[14]

Abdominal surgery, particularly upper abdomen, poses high risk for Post operative pulmonary complications due to proximity of surgical incision to diaphragm and potential for splinting and shallow breaths postoperatively. Furthermore, studies indicate that laparoscopic techniques pose lower risk for Post operative pulmonary complications compared to traditional surgical techniques.[1]

HYPOTHESIS:

There is a difference in the incidence of post-operative pulmonary complications in patients with chronic obstructive lung disease (COPD) undergoing spine surgery under general anesthesia using lung protective ventilation as compared to standard mechanical ventilation.

OBJECTIVE: To compare the incidence of post-operative pulmonary complications using lung protective ventilation and standard mechanical ventilation in patients with COPD undergoing spine surgery under general anesthesia.

METHODOLOGY

This randomized controlled trial was conducted in the Department of Anesthesia at Mayo Hospital, Lahore, over a period of six months from February 27, 2024, to August 27, 2024, following the approval of the study synopsis. The total sample size consisted of 80 patients, with 40 patients allocated to each group. The sample size was calculated using a 95% confidence level and a 5% level of significance, considering the expected percentage of postoperative pulmonary complications to be 6.6% in the protective lung ventilation group and 33.34% in the

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standard mechanical ventilation group. A non-probability consecutive sampling technique was used for patient selection.

Patients included in the study were between 18 and 60 years of age with a history of chronic obstructive pulmonary disease (COPD), regardless of gender. Only those scheduled for elective surgeries under general anesthesia with endotracheal intubation, particularly spinal neurosurgical interventions expected to last more than four hours, were selected. Patients not expected to require postoperative ICU admission were included. Exclusion criteria involved patients with an anticipated difficult airway, pulmonary diseases other than COPD, history of asthma, recent mechanical ventilation, high body mass index (≥35 kg/m^2), recent sepsis or acute respiratory failure, neuromuscular disease, and those on medications such as hypnotics, narcotics, or antidepressants. Patients with organ dysfunction such as hypertension or ischemic heart disease were also excluded.

The study was initiated after ethical approval from the Institutional Review Board of King Edward Medical University. Informed consent was obtained from all participants prior to inclusion. Demographic and clinical data including name, age, gender, weight, history of smoking, preoperative respiratory symptoms, and duration of surgery were collected through a predesigned proforma. After a detailed pre-anesthetic evaluation, participants were randomly assigned to either Group A or Group B using the lottery method. Group A (lung protective ventilation group, LPV) included 40 patients who received ventilation with a low tidal volume of 6–8 mL/kg of ideal body weight, PEEP of 6–8 cmH_2O, and plateau pressure below 30 cmH_2O. Group B (standard mechanical ventilation group, SMV) included 40 patients who received ventilation with a tidal volume of 8–10 mL/kg and PEEP of less than 5 cmH_2O.

All patients underwent a preoperative pulmonology consultation one day before surgery and were kept nil per oral for six hours prior to the procedure. In the operating theatre, standard monitors were attached, and baseline vital signs were recorded. Patients were pre-oxygenated with 100% oxygen at 6 L/min and pre-medicated with intravenous dexamethasone and nalbuphine (0.1 mg/kg). Induction was carried out using intravenous propofol (2–3 mg/kg) until loss of verbal response, followed by bag-mask ventilation and administration of atracurium (0.5 mg/kg). Patients were then ventilated with 100% oxygen and isoflurane (MAC 1.2). After three minutes, endotracheal intubation was performed using an appropriately sized tube, and correct placement was confirmed by auscultation and capnography. Mechanical ventilation was then initiated according to the assigned group protocol, and patients were positioned prone for the surgery.

Anesthesia was maintained with oxygen and isoflurane, while heart rate, blood pressure, oxygen saturation (SpO_2), and end-tidal CO_2 were monitored at 5 minutes, 30 minutes, 1 hour, 2 hours, and at the end of surgery. Arterial blood gas analysis was performed intraoperatively after two hours of ventilation. Hemodynamic parameters were continuously recorded, and any episode of hypotension (mean arterial pressure <20% of baseline) was treated with volume replacement or phenylephrine boluses (50–100 µg). Desaturation (SpO_2 <92%) was managed with increased FiO_2 up to 100%. After surgery, patients were returned to the supine position, oral secretions were cleared, and extubation was performed following reversal of anesthesia with neostigmine (0.03–0.07 mg/kg) and atropine (0.01–0.02 mg/kg).

Postoperatively, all patients were monitored in the post-anesthesia care unit for heart rate, blood pressure, SpO_2, respiratory rate, and arterial blood gases. Supplemental oxygen was provided via Hudson mask for patients with SpO_2 <92%. If oxygen saturation remained below target, non-rebreather mask and continuous positive airway pressure (CPAP) were administered as needed. The incidence of bronchospasm, excessive coughing, and hypoxemia was recorded. Postoperative chest X-rays were used to detect atelectasis or other pulmonary complications, which were managed accordingly. All data were documented on a pre-structured clinical proforma.

Data analysis was performed using SPSS version 26. Quantitative variables such as age and duration of surgery were expressed as mean ± standard deviation, while qualitative variables including gender and postoperative complications were presented as frequencies and percentages. Data were stratified by

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age, gender, smoking history, and duration of surgery. Post-stratification comparisons between the two groups regarding the incidence of postoperative pulmonary complications were made using the Chi-square test. A p-value of ≤0.05 was considered statistically significant.

RESULTS

In Group A, the mean age of patients was 56.15 ± 5.67 years (ranging from 50 to 63 years), while in Group B, it was 55.34 ± 4.98 years (ranging from 50 to 62 years), showing comparable age distribution between the two groups. In both groups, the majority of patients were male, with 34 (85%) in Group A and 35 (87.5%) in Group B. A history of smoking was present in 31 (77.5%) patients in Group A and 30 (75%) patients in Group B. The mean duration of surgery was 4.78 ± 1.22 hours in Group A and 4.93 ± 1.49 hours in Group B.

Table 1: Descriptive statistics of variables

Parameters	Group A	Group B
Age		
mean±SD	56.1±5.6	55.34±4.9
Gender	N(%)	N(%)
Male	34(85)	35(87.5)
Female	6(15)	5(12.5)
Smoking		
Yes	31(77.5)	30(75)
No	9(22.5)	10(25)
Post operative pulmonary complications		
Yes	5(12.5)	13(32.5)
No	35(87.5)	27(67.5)
Use of supplemental oxygen		
Yes	3(7.5)	11(27.5)
No	37(92.5)	29(72.5)
Use of NRM		
Yes	1(2.5)	6(15)
No	39(97.5)	4(85)
Use of CPAP		
Yes	1(2.5)	5(12.5)
No	39(97.5)	35(87.5)
Excessive cough		
Yes	2(5)	10(25)
No	8(95)	30(75)
Bronchospasm		
Yes	1(2.5)	7(17.5)
No	39(97.5)	33(82.5)
Atelectasis		
Yes	1(2.5)	3(7)
No	39(97.5)	37(97)

The table 1 presents a comparison of demographic and postoperative clinical parameters between Group A (lung protective ventilation) and Group B (standard mechanical ventilation). In both groups, the majority of participants were male—85% in Group A and 87.5% in Group B. Most patients were

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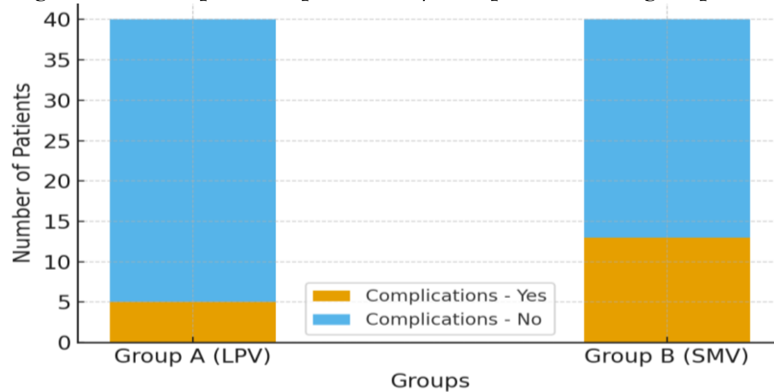
ISSN: (e) 3007-1607 (p) 3007-1593

smokers, with 77.5% in Group A and 75% in Group B, indicating a similar baseline smoking history. Similarly, the need for supplemental oxygen was less frequent in Group A (7.5%) compared to Group B (27.5%). The requirement for non-rebreather mask (NRM) and continuous positive airway pressure (CPAP) was also lower in Group A (2.5% each) than in Group B (15% and 12.5%, respectively). In terms of respiratory symptoms, excessive coughing occurred in only 5% of patients in Group A, whereas it was observed in 25% of Group B patients. Bronchospasm was recorded in 2.5% of Group A compared to 17.5% in Group B. Atelectasis was also less common among patients receiving lung protective ventilation (2.5%) than those in the standard ventilation group (7%).

Figure 1: Post operative pulmonary complications in group A & B



Postoperative pulmonary complications were notably lower in Group A 5(12.5%) compared to Group B 13(32.5%), suggesting a favorable outcome with lung protective ventilation as shown in figure 1. Overall, these findings indicate that patients managed with lung protective ventilation experienced fewer postoperative pulmonary complications and required less respiratory support compared to those who received standard mechanical ventilation.

Table 2: Stratification of complications between groups with respect to age

Age groups	Groups	Complications -yes (n)	Complications -No (n)	p-value
</=50 years	Group A	1	10	0.12
	Group B	4	7	
>50 years	Group A	4	25	0.11
	Group B	9	20	

The table 2 presents the distribution of postoperative pulmonary complications in Group A and Group B across two age categories: ≤50 years and >50 years. Among patients aged ≤50 years, 1 patient in Group A and 4 patients in Group B developed complications, while 10 patients in Group A and 7 in Group B had no complications (p = 0.12). In the >50 years category, 4 patients in Group A and 9 in Group B experienced complications, whereas 25 in Group A and 20 in Group B remained complication-free (p = 0.11). Although complications were more frequent in Group B in both age groups, the differences were not statistically significant.

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Table 3: Stratification of complications between groups with respect to smoking

Smoking	Groups	Complications-yes (n)	Complications-No (n)	p-value
Yes	Group A	4	27	0.05
	Group B	10	20	
No	Group A	1	8	0. 3
	Group B	3	7	

The table 3 shows the stratification of postoperative pulmonary complications between the two groups based on smoking status. Among smokers, 4 patients in Group A and 10 patients in Group B developed complications, while 27 in Group A and 20 in Group B had no complications (p = 0.05). Among non-smokers, 1 patient in Group A developed complications, and 8 had no complications (p = 0.3). Although complications were more frequent among smokers, the difference between the groups was statistically significant only for the smoking group (p = 0.05).

Table 4: Stratification of complications between groups with respect to duration of surgery

Duration	Groups	Complications-yes (n)	Complications-No (n)	p-value
4-5 hours	Group A	2	15	0.12
	Group B	6	12	
>5hours	Group A	3	25	0.06
	Group B	7	15	

The table 4 presents the stratification of postoperative pulmonary complications between the two groups based on the duration of surgery. For surgeries lasting 4–5 hours, 2 patients in Group A and 6 in Group B developed complications, while 15 in Group A and 12 in Group B had no complications (p = 0.12). For surgeries lasting more than 5 hours, 3 patients in Group A and 7 in Group B experienced complications, whereas 25 in Group A and 15 in Group B did not (p = 0.06). Although complications were more common in longer surgeries and in Group B, the differences were not statistically significant.

Table 5: Stratification of complications between groups with respect to gender

Gender	Groups	Complications-yes (n)	Complications-No (n)	p-value
Male	Group A	4	30	0.02
	Group B	12	23	
Female	Group A	1	5	0.88
	Group B	1	4	

The table 5 shows the stratification of postoperative pulmonary complications between the two groups based on gender. Among male patients, 4 in Group A and 12 in Group B developed complications, while 30 in Group A and 23 in Group B had no complications (p = 0.02), indicating a statistically significant difference. Among female patients, 1 in each group developed complications, and 5 in Group A and 4 in Group B had no complications (p = 0.88). This shows that complications were significantly higher among male patients in Group B, while no significant difference was observed among females.

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DISCUSSION

COPD significantly elevates the risk of Post operative pulmonary complications in patients undergoing spine surgery under GA. Choice of ventilation strategy during surgery plays crucial role in influencing these outcomes. LPV strategies, which typically involve lower tidal volumes and higher PEEP, aims to minimize lung injury and improve overall respiratory function post-operatively. In contrast, SMV often utilizes higher tidal volumes and lower PEEP, which may increase the likelihood of Post operative pulmonary complications. This study has compared the occurrence of Post operative pulmonary complications between COPD patients receiving LPV versus those subjected to SMV, with goal of identifying optimal ventilation approach to enhance patient outcomes and reduce the burden of post-operative respiratory complications.

In Group A and B mean age of patients calculated was 56.15+5.67 years and 55.34 + 4.98 years, respectively. In group A and B 31(77.5%) and 30(75%) patients found to have history of smoking.

Similar to our findings, it was observed previously that over 70% of COPD are caused by tobacco use. In meantime, tobacco use accounts for 30–40% of instances in, with home air pollution also emerging as significant contributing factor. People over 40 and smokers are two groups most affected by COPD. It is becoming more common as age advances, which makes it one of biggest worldwide health issues. As of right now, COPD is third most common cause of illness and death globally.[15] Research findings on gender frequency in COPD vary. By 2050, it is projected that there will be approximately 454.4 million men and 191.2 million women living with COPD globally, highlighting the significant impact on both genders but with higher prevalence among men.[16] Some recent studies have shown that women are more likely to have COPD than males; rates have ranged from 45% to 53.8%.[17]

In group A less patients have developed Post operative pulmonary complications as compared to group B i.e. 5(87.5%) vs 13(32.5%), p=0.03. In group A less patients had utilized supplemental oxygen 7.5% vs 27.5% (p=0.01), NRM 2.5% vs 15% (p=0.04), and CPAP 2.5% vs 12.5% (p=0.08). 5% vs 25% (p=0.01) had developed excessive cough, 2.5% vs 17.5% (p=0.02) had developed bronchospasm, and 2.5% vs 7% (p=0.30) patients had developed, atelectasis. Data stratification with respect to age history of smoking, and duration of surgery found to be insignificant at p>0.05. Data stratification found to be insignificant at p>0.05.

In spine surgery patients with COPD, comparison between LPV and SMV techniques in reducing Post operative pulmonary complications is crucial. Research indicates that LPV strategies, including low tidal volume and PEEP, can significantly decrease the incidence of Post operative pulmonary complications.[18-20] Studies have shown that LPV can lead to reduction in severity of Post operative pulmonary complications and decreased need for postoperative oxygen supplementation, ultimately improving clinical outcomes.[19, 21] Additionally, LPV has been associated with lower incidence of early Post operative pulmonary complications compared to conventional MV in patients undergoing spinal surgery in prone position, emphasizing its potential benefits in this specific surgical setting. Therefore, implementing LPV strategies in spine surgery for COPD patients may be beneficial in reducing Post operative pulmonary complications and improving postoperative outcomes.

In Park et al. trial, effects on Post operative pulmonary complications of intraoperative conventional ventilation combined with recruitment manoeuvres (Group R) vs LPV approach (Group P) were compared, findings showed that both Post operative pulmonary complications and postoperative atelectasis occurred substantially less frequently in Group P than in Group R (14% versus 47%, p=0.023) and 14% versus 42%, p=0.023). Furthermore, only Group R (5%, p=0.023) had pneumonia[22] .

Similar research was done to determine which intraoperative MV strategy reduced Post operative pulmonary complications more effectively: one that used higher PEEP and alveolar recruitment manoeuvres, or one that used lower PEEP without manoeuvres. According to their results, Post operative pulmonary complications were more common in low-level PEEP group than in high-level PEEP group, yet there was no statistically significant difference (23.6% versus 21.3%, p=0.23). Most frequent consequence was hypoxia (SPO2 <90%), which was more common in low- PEEP group

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ISSN: (e) 3007-1607 (p) 3007-1593

(15.6% versus 13.7%, p=0.22). Additionally, low-level PEEP group experienced atelectasis more frequently (5.6% versus 4.4%, p=0.25) and In fact, use of high levels of PEEP was associated with impaired haemodynamic, mandating the increased use of fluids and vasoactive drugs in the intraoperative period.[23]

In order to determine whether breathing strategy that included recruitment manoeuvres in addition to high PEEP could prevent Post operative pulmonary complications, Hemmes et al. undertook study. According to study, there was no discernible difference in rate of atelectasis between two groups (12% each, p=0.90), with Post operative pulmonary complications occurring in 40% of patients in higher PEEP group and 39% in lower PEEP group (p=0.84).[24]

When compared to conventional-tidal volume ventilation at same PEEP level, Karalapillai et al. investigated if low-tidal volume breathing technique could lower the occurrence of Post operative pulmonary complications in adult patients following major surgery. According to their results, there was no discernible difference in Post operative pulmonary complications between low-tidal-volume group (38%) and conventional group (39%), (p=0.64). With 24.7% of low-tidal-volume group and 24.9% of conventional group experiencing atelectasis, it was most prevalent PPC in both groups (p=0.93).[25]

Effects of various MV modalities on Post operative pulmonary complications and airway mechanics were studied, according to study, VCV group had substantially greater incidence of Post operative pulmonary complications (39.1%) than PCV group (13.0%) (p=0.044).[26]

Our study highlights the significant benefits of LPV in reducing postoperative pulmonary complications in COPD patients undergoing spine surgery, while also emphasizing its broader clinical implications. By incorporating strategies such as increased PEEP, LPV not only improves perioperative respiratory outcomes but also positively influences the surgical field by reducing venous congestion and optimizing venous drainage. This can contribute to decreased intraoperative blood loss and better visualization for the surgical team, ultimately enhancing procedural efficiency and safety. These findings underscore the utility of LPV as a holistic approach to improve both surgical and respiratory outcomes, advocating its adoption as a standard ventilatory strategy in high-risk surgical populations.

Our study has certain limitations, single cantered study, and small sample size and strict selection criteria will affect the generalizability of results. Furthermore, we have not divided patients according to severity of COPD. Further, researches are required keeping these limitations under consideration.

CONCLUSION

Our study has suggested that, lung-protective ventilation (LPV) significantly reduces the incidence of postoperative pulmonary complications (Post operative pulmonary complications) vs Standard Mechanical Ventilation (SMV) in patients with chronic obstructive pulmonary disease (COPD) undergoing spine surgery. This approach not only enhances perioperative respiratory outcomes but also underscores the importance of tailoring ventilation strategies to the specific needs of high-risk patient populations. Implementing LPV as a standard practice in such cases could potentially improve overall surgical outcomes and reduce healthcare burdens associated with Post operative pulmonary complications.

Conflict of interest

None

Funding

None

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Frontier in Medical & Health Research
ISSN: (e) 3007-1607 (p) 3007-1593

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