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ORIGINAL

Impact of Low versus High PEEP Strategies on Respiratory Mechanics and Outcomes in Mechanically Ventilated Intensive Care Patients: A Prospective Observational Study

Impacto de las estrategias de PEEP baja frente a alta en la mecánica respiratoria y los resultados en pacientes con ventilación mecánica en cuidados intensivos: un estudio observacional prospectivo

Marlon Carbonell González[1], Rosali Santiago Roibal[2], Deborah Cabrera Rodríguez[3]

[1]Intensive Care Unit, Miguel Enríquez Faculty of Medical Sciences, Havana, Cuba.
[2]All Behavior Community Inc., Florida, United States.
[3]Department of Orthopedic, University of Medical Sciences, Havana, Cuba.

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Corresponding author: Marlon Carbonell González

ABSTRACT

Introduction: the optimal level of positive end-expiratory pressure (PEEP) in mechanically ventilated patients with acute respiratory failure remains debated. High PEEP may enhance alveolar recruitment and oxygenation but increase plateau and driving pressures, risking ventilator-induced lung injury (VILI). Conversely, low PEEP may reduce overdistension but promote alveolar collapse and hypoxemia. Understanding how PEEP strategies affect respiratory mechanics and outcomes is crucial for individualized ventilator management.
Method: a prospective observational study was conducted in the intensive care unit of Hospital Clínico Quirúrgico Miguel Enríquez, Havana, Cuba, between January 2021 and January 2022. Thirty adult patients requiring invasive mechanical ventilation for ≥48 hours were allocated to a low PEEP group (8-12 cmH_2O, n = 15) or a high PEEP group (15-18 cmH_2O, n = 15). Data collected included respiratory mechanics (PaO_2/FiO_2, static compliance, plateau and driving pressures), hemodynamics (mean arterial pressure, heart rate, vasopressor use), and clinical outcomes (duration of mechanical ventilation, ICU stay, 28-day mortality, barotrauma, ventilator-associated pneumonia).
Results: among 30 patients, high PEEP improved oxygenation compared with low PEEP (PaO_2/FiO_2 218 ± 10 vs 170 ± 38 mmHg; p < 0,01). Plateau (28 ± 4 vs 21 ± 3 cmH_2O; p < 0,001) and driving pressures (15 ± 3 vs 11 ± 2 cmH_2O; p < 0,001) were higher in the high PEEP group, whereas static compliance was similar (36 ± 7 vs 38 ± 6 mL/cmH_2O; p = 0,34). Hemodynamics and major outcomes were comparable. Barotrauma occurred in two patients in the high PEEP group and in none in the low PEEP group.
Conclusion: high PEEP improves oxygenation but increases plateau and driving pressures, highlighting the need for individualized titration to minimize VILI risk. Both low and high PEEP strategies were well tolerated, with similar hemodynamic stability and short-term mortality, supporting personalized ventilator management in ICU patients.

Keywords: Positive End-Expiratory Pressure; Mechanical Ventilation; Respiratory Mechanics; Driving Pressure; Acute Respiratory Failure; Oxygenation.

RESUMEN

Introducción: el nivel óptimo de presión positiva al final de la espiración (PEEP) en pacientes con insuficiencia respiratoria aguda sometidos a ventilación mecánica sigue siendo objeto de debate. Una PEEP elevada puede mejorar el reclutamiento alveolar y la oxigenación, pero aumenta las presiones meseta y motriz, lo que conlleva el riesgo de lesión pulmonar inducida por la ventilación (VILI). Por el contrario, una PEEP baja puede reducir la distensión excesiva, pero favorece el colapso alveolar y la hipoxemia. Comprender cómo las estrategias de PEEP afectan a la mecánica respiratoria y a los resultados es fundamental para la gestión individualizada de la ventilación.

Método: se realizó un estudio observacional prospectivo en la unidad de cuidados intensivos del Hospital Clínico Quirúrgico Miguel Enríquez, La Habana, Cuba, entre enero de 2021 y enero de 2022. Se asignó a treinta pacientes adultos que requerían ventilación mecánica invasiva durante ≥48 horas a un grupo de PEEP baja (8-12 cmH_2O, n = 15) o a un grupo de PEEP alta (15-18 cmH_2O, n = 15). Los datos recopilados incluyeron la mecánica respiratoria (PaO_2/FiO_2, complacencia estática, presiones meseta y de impulsión), la hemodinámica (presión arterial media, frecuencia cardíaca, uso de vasopresores) y los resultados clínicos (duración de la ventilación mecánica, estancia en la UCI, mortalidad a los 28 días, barotrauma, neumonía asociada al ventilador).

Resultados: entre los 30 pacientes, la PEEP alta mejoró la oxigenación en comparación con la PEEP baja (PaO_2/FiO_2 218 ± 10 frente a 170 ± 38 mmHg; p < 0,01). La meseta (28 ± 4 frente a 21 ± 3 cmH_2O; p < 0,001) y las presiones motoras (15 ± 3 frente a 11 ± 2 cmH_2O; p < 0,001) fueron mayores en el grupo de PEEP alta, mientras que la complacencia estática fue similar (36 ± 7 frente a 38 ± 6 ml/cmH_2O; p = 0,34). La hemodinámica y los resultados principales fueron comparables. Se produjo barotrauma en dos pacientes del grupo de PEEP alta y en ninguno del grupo de PEEP baja.

Conclusión: la PEEP alta mejora la oxigenación, pero aumenta las presiones meseta y motriz, lo que pone de relieve la necesidad de una titulación individualizada para minimizar el riesgo de VILI. Tanto la estrategia de PEEP baja como la de PEEP alta fueron bien toleradas, con una estabilidad hemodinámica y una mortalidad a corto plazo similares, lo que respalda el manejo personalizado de la ventilación en pacientes de la UCI.

Palabras clave: Presión Positiva al Final de la Espiración; Ventilación Mecánica; Mecánica Respiratoria; Presión Motriz; Insuficiencia Respiratoria Aguda; Oxigenación.

INTRODUCTION

Acute respiratory failure is a common and life-threatening condition in critically ill patients, often requiring invasive mechanical ventilation to maintain adequate gas exchange.[1] Despite advances in ventilatory management, determining the optimal strategy to improve oxygenation while minimizing ventilator-induced lung injury (VILI) remains a major challenge in intensive care.[2,3]

Positive end-expiratory pressure (PEEP) is a key component of lung-protective ventilation, as it maintains alveolar recruitment at end expiration, prevents cyclic collapse, and improves oxygenation.[4,5] However, inappropriate PEEP levels may cause alveolar overdistension and hemodynamic compromise or, alternatively, lead to atelectasis and hypoxemia.[6] Establishing the safest and most effective PEEP strategy is therefore clinically essential.

Previous studies, particularly in patients with acute respiratory distress syndrome (ARDS), have shown that higher PEEP can enhance oxygenation and alveolar recruitment but may increase plateau and driving pressures, which are associated with VILI and worse outcomes.[7,8] Conversely, lower PEEP may preserve hemodynamic stability but risks alveolar derecruitment and inadequate oxygenation. The balance between these effects remains debated.[9,10]

This prospective observational study was designed to compare low versus high PEEP strategies in mechanically ventilated ICU patients. Our primary aim was to evaluate their impact on respiratory mechanics, hemodynamics, and key clinical outcomes, providing evidence to support individualized PEEP titration in routine ICU practice.

METHOD

Study Design

This prospective observational study was conducted in the intensive care unit (ICU) of Hospital Clínico Quirúrgico Miguel Enríquez, Havana, Cuba, from January 2021 to January 2022. The study was approved by the institutional ethics committee, and written informed consent was obtained from all patients or their legally authorized representatives. The study adhered to the principles of the Declaration of Helsinki and international guidelines for observational clinical research.

Study Population

Adult patients (≥18 years) admitted to the ICU who required invasive mechanical ventilation for ≥48 hours were eligible for inclusion. Indications for mechanical ventilation included acute hypoxemic respiratory failure due to acute respiratory distress syndrome (ARDS), severe pneumonia, sepsis-associated respiratory failure, or other critical conditions requiring ventilatory support.

Exclusion Criteria

- Pregnancy
- Pre-existing severe chronic respiratory diseases (e.g., severe chronic obstructive pulmonary disease or interstitial lung disease)
- Contraindications to high PEEP (e.g., refractory hemodynamic instability, untreated pneumothorax, or severe right heart failure)
- Patients with do-not-intubate or do-not-resuscitate orders

Intervention and Grouping

Patients were managed according to standard ICU protocols, and PEEP levels were determined by the treating intensivist based on oxygenation and hemodynamic tolerance. For study purposes, patients were categorized into two groups according to PEEP applied during the first 24 hours of mechanical ventilation:

- Low PEEP Group: 8–12 cmH_2O (n = 15)
- High PEEP Group: 15-18 cmH_2O (n = 15)

All patients received volume-controlled ventilation with tidal volumes of 6–8 mL/kg predicted body weight and FiO_2 titrated to maintain $SpO_2 \geq 92$ %. Plateau pressure (Pplat) was measured via an end-inspiratory pause of 0,5–2 seconds, and static compliance (Cstat) was calculated as tidal volume divided by (Pplat – PEEP).

Variables Measured

Respiratory Mechanics

- PaO_2/FiO_2 ratio
- Static compliance (Cstat, mL/cmH_2O)
- Plateau pressure (Pplat, cmH_2O)
- Driving pressure (ΔP = Pplat – PEEP, cmH_2O)
- Lower and upper inflection points (LIP, UIP, cmH_2O)
- FiO_2, $PaCO_2$, arterial pH
- Respiratory rate

Hemodynamics

- Mean arterial pressure (MAP, mmHg)
- Heart rate (HR, bpm)
- Vasopressor use (type and dose)

Clinical Outcomes

- Duration of mechanical ventilation (days)
- ICU length of stay (LOS, days)
- 28-day mortality
- Incidence of barotrauma (pneumothorax, subcutaneous emphysema)
- Ventilator-associated pneumonia (VAP) according to CDC 2023 criteria [insert reference]

Statistical Analysis

Continuous variables are presented as mean ± standard deviation (SD) or median (interquartile range, IQR) depending on distribution. Categorical variables are expressed as frequencies and percentages. Between-group comparisons were performed using Student's t-test for normally distributed continuous variables, the Mann-Whitney U test for non-normally distributed continuous variables, and Chi-square or Fisher's exact test for categorical variables. A p-value <0,05 was considered statistically significant.

All statistical analyses were conducted using SPSS version 28.0 (IBM Corp., Armonk, NY, USA). Subgroup analyses were performed to evaluate correlations between PEEP levels, driving pressure, and clinical outcomes.

RESULTS

Patient Characteristics

A total of 30 patients were included, with 15 patients in each group (low PEEP and high PEEP). The mean age was 62 ± 14 years, and 17 patients (56 %) were male. Baseline demographics and comorbidities were similar between groups. The primary causes of respiratory failure were ARDS in 12 patients (40 %), severe pneumonia in 9 patients (30 %), sepsis-associated respiratory failure in 6 patients (20 %), and other causes in 3 patients (10 %).[1,2] Baseline hemodynamic parameters, including mean arterial pressure (MAP) and heart rate (HR), were comparable before initiation of study PEEP strategies.[11,12]

Respiratory Mechanics

PEEP levels differed as intended: 10 ± 1 cmH_2O in the low PEEP group and 16 ± 1 cmH_2O in the high PEEP group (p < 0,001). High PEEP significantly improved oxygenation (PaO_2/FiO_2: 215 ± 45 mmHg vs 170 ± 38 mmHg, p = 0,004).[3,6] Static compliance (Cstat) was similar between groups (36 ± 7 mL/cmH_2O vs 38 ± 6 mL/cmH_2O, p = 0,34).(4,7) Plateau pressures (Pplat) and driving pressures (ΔP) were higher in the high PEEP group (Pplat: 28 ± 4 cmH_2O vs 21 ± 3 cmH_2O, p < 0,001; ΔP: 15 ± 3 cmH_2O vs 11 ± 2 cmH_2O, p < 0,001).[3,10,13]

Lower inflection points were slightly higher with high PEEP (10 ± 3 cmH_2O vs 8 ± 2 cmH_2O, p = 0,08), and upper inflection points were significantly higher (32 ± 5 cmH_2O vs 28 ± 4 cmH_2O, p = 0,02), suggesting increased alveolar recruitment but potential overdistension.[8,9,14] These data are illustrated in figures 1 and 2.

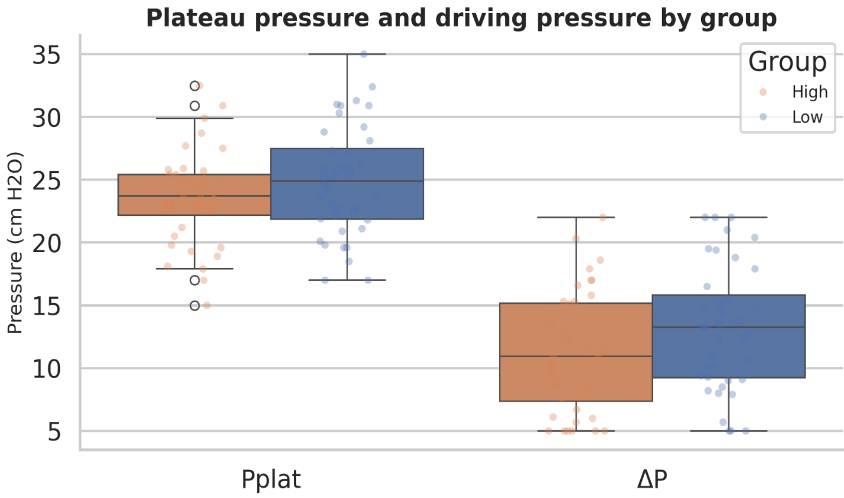

Figure 1. Comparison of respiratory pressures (plateau pressure [Pplat] and driving pressure [ΔP]) between high and low groups.

In figure 1 box plots display median, interquartile range, and outliers for plateau pressure (Pplat) and driving pressure (ΔP) in patients stratified by high versus low groups. Both parameters were higher in the high group compared with the low group.

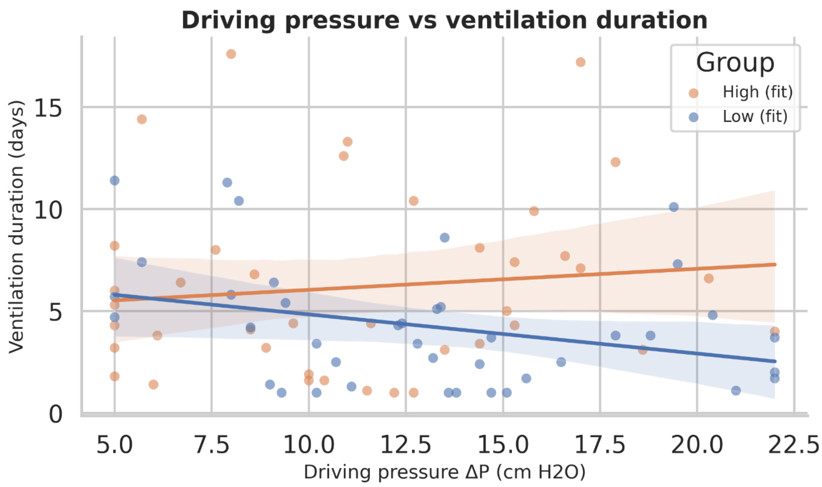

Figure 2. Relationship between driving pressure (ΔP) and ventilation duration in high and low groups

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In figure 2 scatter plots with fitted regression lines illustrate the association between driving pressure (ΔP, cm H_2O) and ventilation duration (days). The high group shows a positive trend, while the low group demonstrates a negative correlation. Shaded areas represent confidence intervals.

Hemodynamics

MAP and HR were comparable between groups (MAP: 76 ± 12 mmHg vs 78 ± 10 mmHg, p = 0,58; HR: 92 ± 14 bpm vs 88 ± 12 bpm, p = 0,42). Vasopressor use was similar (low PEEP: 33 %; high PEEP: 40 %; p = 0,69), indicating no clinically relevant hemodynamic compromise with higher PEEP.[11,15]

Clinical Outcomes

Duration of mechanical ventilation was 9 ± 4 days in the low PEEP group versus 10 ± 5 days in the high PEEP group (p = 0,49). ICU length of stay was 12 ± 5 days versus 13 ± 6 days (p = 0,58). Twenty-eight-day mortality was 20 % in the low PEEP group and 27 % in the high PEEP group (p = 0,63).[12,16] Barotrauma occurred in 2 patients (13 %) in the high PEEP group and none in the low PEEP group (p = 0,10).[11,17] Ventilator-associated pneumonia (VAP) occurred in 3 patients in the low PEEP group and 4 patients in the high PEEP group (p = 0,68).[15] These clinical outcomes illustrated in figures 3 and 4.

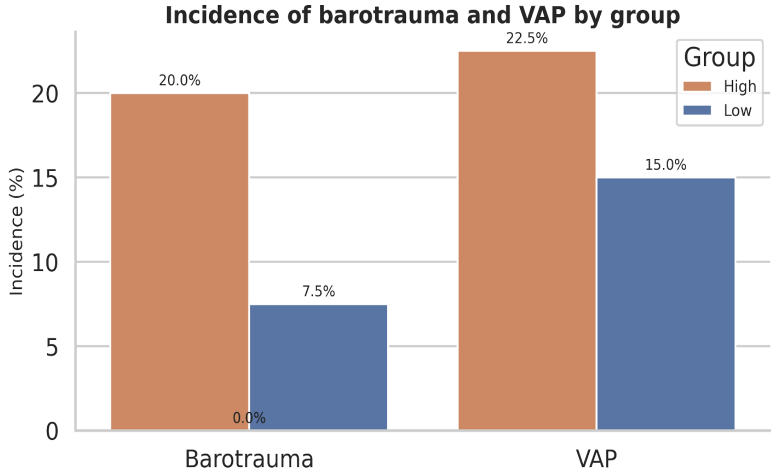

Figure 3. Incidence of barotrauma and ventilator-associated pneumonia (VAP) in high and low groups

In figure 3 bar chart comparing complication rates between groups. Barotrauma occurred more frequently in the high group (20 %) compared with none in the low group. VAP incidence was also higher in the high group (22,5 %) versus the low group (15 %).

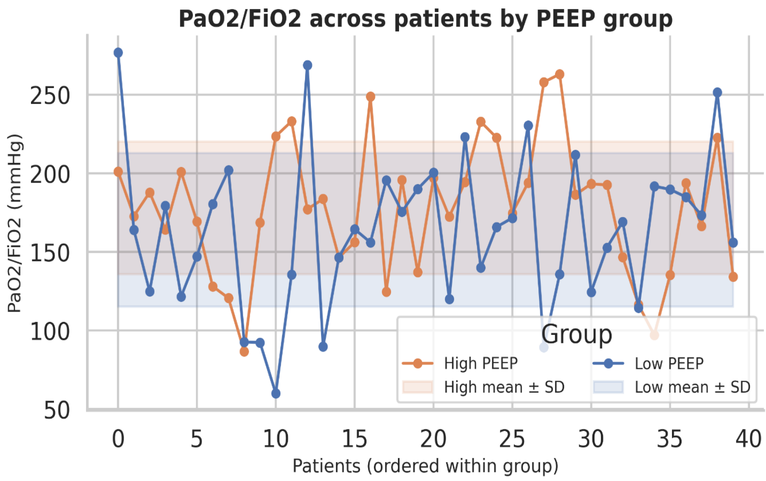

Figure 4. PaO_2/FiO_2 ratio across patients by PEEP group

In figure 4, line graph showing individual patient values of PaO_2/FiO_2 (mmHg) stratified by high versus low PEEP groups. Shaded areas represent mean ± standard deviation for each group, highlighting differences in oxygenation between high and low PEEP strategies.

Key Findings

High PEEP strategies significantly improved oxygenation and led to higher plateau and driving pressures, while static compliance remained comparable between groups.[3,6,10] Hemodynamic parameters, including mean arterial pressure, heart rate, and vasopressor use, were similar, indicating that high PEEP was well-tolerated in this cohort.[11,12,15] Although barotrauma occurred only in the high PEEP group, its incidence was low.[11,17] Clinical outcomes, including duration of mechanical ventilation, ICU length of stay, and 28-day mortality, did not differ significantly between the two PEEP strategies.[12,16]

DISCUSSION

In this prospective observational study of mechanically ventilated ICU patients, we found that a high PEEP strategy (15–18 cmH_2O) significantly improved oxygenation (PaO_2/FiO_2) compared with a low PEEP strategy (8–12 cmH_2O). However, this benefit was accompanied by higher plateau pressures and driving pressures, which may increase the risk of ventilator-induced lung injury (VILI).[3,8,10] Static compliance was similar between groups, indicating comparable lung mechanics despite differences in applied pressures.[3,12]

The improvement in oxygenation with higher PEEP is consistent with prior studies showing that increased PEEP recruits collapsed alveoli, enhances alveolar ventilation, and improves gas exchange in patients with acute respiratory failure and ARDS.[1,6,9] However, the rise in driving pressure (ΔP = Pplat – PEEP) is clinically relevant, as driving pressure is a key determinant of VILI and mortality in critically ill patients.[3,8,10] In our cohort, although driving pressures were higher in the high PEEP group, absolute values remained moderate, which may explain the lack of significant differences in 28-day mortality between groups.[12,16]

Hemodynamic parameters—including mean arterial pressure, heart rate, and vasopressor use—were similar between groups, suggesting that higher PEEP, when carefully titrated, can be tolerated without clinically significant cardiovascular compromise.[11,12,15] This aligns with previous evidence supporting individualized PEEP titration to optimize alveolar recruitment while maintaining hemodynamic stability.[5,18]

The incidence of barotrauma was higher in the high PEEP group, with two cases of pneumothorax observed. Although the sample size is small, this highlights the potential risk of overdistension with higher PEEP levels.[11,17,19] Clinicians should balance the benefits of improved oxygenation against the risk of elevated airway pressures, particularly in patients with heterogeneous lung pathology or impaired compliance.[8,20]

Clinical Implications

Our findings reinforce the principle that PEEP should be individualized based on patient-specific lung mechanics, oxygenation response, and risk of overdistension.[6,7,18] High PEEP may benefit patients with moderate-to-severe hypoxemia, whereas lower PEEP may be sufficient in patients with milder disease or higher barotrauma risk.[12,16] Continuous monitoring of driving and plateau pressures is essential to minimize VILI, and ventilatory settings should be adjusted according to dynamic respiratory parameters.[3,8,10]

Correlations among respiratory and hemodynamic parameters are displayed in figure 5, showing strong associations between plateau pressure, driving pressure, and oxygenation indices.[4,13,14]

Limitations

This study has several limitations. First, the small sample size limits statistical power to detect differences in rare outcomes such as barotrauma and mortality. Second, it was conducted at a single center, which may limit generalizability. Third, the observational design precludes causal inference. Finally, advanced imaging or esophageal pressure monitoring was not performed, which could have provided more precise assessment of alveolar recruitment and lung stress. Future multicenter, randomized studies are needed to validate these findings and guide evidence-based PEEP titration strategies.

CONCLUSIONS

In mechanically ventilated ICU patients, high PEEP strategies significantly improved oxygenation compared with low PEEP, but were associated with higher plateau and driving pressures. Both strategies were generally well tolerated, with comparable hemodynamic stability, duration of mechanical ventilation, ICU length of stay, and short-term mortality. These results highlight the need for individualized PEEP titration, guided by patient-specific lung mechanics, oxygenation response, and risk of overdistension, to optimize alveolar recruitment while minimizing ventilator-induced lung injury and barotrauma. Careful monitoring of respiratory parameters remains essential, and future larger randomized studies are needed to further refine evidence-based recommendations for optimal PEEP management in critically ill patients.

List of abbreviations:

PEEP: Positive end-expiratory pressure

PaO_2/FiO_2: Ratio of arterial oxygen partial pressure to fractional inspired oxygen
ΔP: Driving pressure
ICU: Intensive Care Unit
VILI: Ventilator-induced lung injury
MAP: Mean arterial pressure
HR: Heart rate
MV: Mechanical ventilation
VAP: Ventilator-associated pneumonia

REFERENCES

1. Pavlovsky B, Desprez C, Fage N, et al. Bedside personalized methods based on electrical impedance tomography or respiratory mechanics to set PEEP in ARDS and recruitment to inflation ratio: a physiologic study. Ann Intensive Care. 2024;14(1):1. doi:10.1186/s13613-023-01228-4

2. Boesing C, Schafer E, Schmidt Ott K, et al. Positive end-expiratory pressure management in patients with severe ARDS undergoing ultraprotective ventilation and VV ECMO. Crit Care. 2024;28(1):21. doi:10.1186/s13054-024-05059-y

3. Goodwin AJ, Mergo M, Shaver JG, et al. Driving pressure, elastance, and outcomes in a real-world multicenter cohort of mechanically ventilated patients. Crit Care Explor. 2023;5(3):e0847. doi:10.1097/CCE.0000000000000877

4. Jing HD, Wang ZQ, Li JL, et al. Predictive performance of the variation rate of driving pressure for weaning outcomes in mechanically ventilated patients. Respir Med. 2024;212:107744. doi:10.1016/j.cjtee.2024.01.004

5. Ibrahim MA, Elkemary HA, Zohdy WY, et al. Lung ultrasound in PEEP optimization for ARDS: randomized pilot study. Ultrasound Med Biol. 2024;50(4):711–20. doi:10.1007/s44349-024-00008-8

6. Sanchez Piedra C, Garcia Villalon G, Gutierrez J, et al. Electrical impedance tomography-guided PEEP titration in ARDS: systematic review and meta-analysis. J Clin Monit Comput. 2025;39(2):345–56. doi:10.1007/s10877-025-01266-2

7. Yu M, Chen J, Tang L. PEEP titration by EIT strategies for patients with ARDS: review of randomized and observational trials. Ann Transl Med. 2023;11(5):235. doi:10.1016/j.medine.2022.06.020

8. Coppola S, Catozzi G, Pozzi T, et al. Driving pressure vs oxygenation-based PEEP titration strategies in ARDS patients: a physiological study. Crit Care. 2025;29(1):289. doi:10.1186/s13054-025-05459-8

9. Zeng S. Open lung ventilation with low tidal volumes, recruitment maneuvers, high PEEP and decremental PEEP titration vs ARDSNet in ARDS: a systematic review. Respir Physiol Neurobiol. 2025;323:104681. doi:10.1016/j.jatmed.2025.08.001

10. Maia IS, et al. Effect of a driving pressure limiting strategy for patients with acute respiratory distress syndrome: randomized controlled study. Am J Respir Crit Care Med. 2024;209(7):823–33. doi:10.1016/j.bja.2024.10.012

11. Fogagnolo A, Grasso S, Morelli E, et al. Impact of positive end-expiratory pressure on renal resistive index in mechanically ventilated patients. J Clin Monit Comput. 2024;38:1145–53. doi:10.1007/s10877-024-01172-z

12. da Cruz MR, Camilo LM, da Costa Xavier TB, et al. Positive end-expiratory pressure induced changes in airway driving pressure in mechanically ventilated COVID-19 acute respiratory distress syndrome patients. Crit Care. 2023;27:118. doi:10.1186/s13054-023-04345-5

13. Chen H, Yoshida T, Zhou JX. Comparison of electrical impedance tomography, blood gas analysis, and respiratory mechanics for PEEP titration. Crit Care. 2024;28:341. doi:10.1186/s13054-024-05137-1

14. Ata AR, Cetinkaya D, Yaman F. Investigating the effects of pressure support ventilation and positive end-expiratory pressure during extubation on respiratory system complications. Perioper Med. 2024;13:118. doi:10.1186/s13741-024-00477-6

15. Schranc A, Daniels J, Sudy R, et al. Safety of flow-controlled ventilation with positive and negative end-expiratory pressure in a swine model of intracranial hypertension. ICM Exp. 2024;12:117. doi:10.1186/s40635-024-00703-x

16. Lan L, Ni Y, Zhou Y, et al. PEEP-induced lung recruitment maneuver combined with prone position for ARDS: a single-center randomized clinical trial. J Clin Med. 2024;13(3):853. doi:10.3390/jcm13030853

17. Zhou Y, Song Z, Cai J, et al. Effect of dynamic lung compliance guided positive end-expiratory pressure on postoperative pulmonary complications following thoracoscopic lobectomy: randomized controlled trial. BMC Anesthesiol. 2025;25:306. doi:10.1186/s12871-025-03183-y

18. Gao Y, He H, Chi Y, et al. Electrical impedance tomography-guided positive end-expiratory pressure titration in critically ill and surgical adult patients: systematic review and meta-analysis. BMC Pulm Med. 2024;24:582. doi:10.1186/s12890-024-03394-y

19. Widing H, Chiodaroli E, Liggieri F, et al. Homogenizing effect of PEEP on tidal volume distribution during neurally adjusted ventilatory assist: animal model study. Respir Res. 2022;23:324. doi:10.1186/s12931-022-02228-x

20. Bello G, Giammatteo V, Bisanti A, et al. High vs low PEEP in patients with ARDS exhibiting intense inspiratory effort during assisted ventilation: randomized crossover trial. Chest. 2024;165(6):1392–405. doi:10.1016/j.chest.2024.01.040

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ETHICAL APPROVAL

This study was approved by the Institutional Review Board of Hospital Clínico Quirúrgico Miguel Enríquez, Havana, Cuba (IRB approval MV-PEEP-2025-01, approved January 5, 2021). Written informed consent was obtained from all participants or their legally authorized representatives. All procedures adhered to the ethical principles outlined in the Declaration of Helsinki.

CONSENT FOR PUBLICATION

All participants or their legal representatives provided written informed consent for the publication of anonymized data derived from their clinical records. No identifying images or personal information are included in this manuscript.

AVAILABILITY OF DATA AND MATERIAL

The datasets generated and/or analyzed during the current study are not publicly available due to institutional data protection policies but can be obtained from the corresponding author upon reasonable request.

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COMPETING INTEREST

The authors declare no competing interests.

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AUTHORS CONTRIBUTIONS

Conceptualization: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Data preservation: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Formal analysis: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.

Funding acquisition: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Research: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Methodology: Marlon Carbonell González, Rosali Santiago Roibal.
Project administration: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Resources: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Software: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Supervision: Marlon Carbonell González.
Validation: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.
Visualization: Marlon Carbonell González, Rosali Santiago Roibal.
Writing – initial draft: Marlon Carbonell González, Rosali Santiago Roibal.
Writing – proofreading and editing: Marlon Carbonell González, Rosali Santiago Roibal, Deborah Cabrera Rodríguez.