Moe Halawani, MD | O-Two Clinical Specialist

o_two INSIGHTS

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Insights into ARDS management

1 Introcuction

The insights presented here summarize evidence-based clinical practice recommendations from systematic reviews and meta-analyses conducted by a multidisciplinary committee from the American Thoracic Society, the European Society of Intensive Care Medicine, and the Society of Critical Care Medicine. These guidelines focus on mechanical ventilation strategies for managing adult patients with Acute Respiratory Distress Syndrome (ARDS). The primary aim is to assist healthcare providers in making informed decisions about ventilatory strategies to optimize patient outcomes, ensuring that the recommendations are scientifically robust and clinically applicable. Healthcare providers are encouraged to adapt these recommendations to patients' conditions and clinical judgment.

2 Lower Tidal Volumes and Inspiratory Pressures

• Strategy: For all adult patients with ARDS, starting mechanical ventilation with a tidal volume of 4–8 ml/kg of predicted body weight (PBW) is strongly recommended. This approach aims to minimize the risk of ventilator-induced lung injury (VILI), a significant concern in mechanically ventilated patients. Lower tidal volumes and controlled inspiratory pressures help protect the lungs by preventing alveolar overdistension and reducing the stress and strain on lung tissues.

• Application: Start with an initial tidal volume set at 6 ml/kg PBW. Adjust this volume based on the patient's pulmonary compliance, respiratory needs, and specific clinical situations. The tidal volume can be increased to 8 ml/kg PBW if required.

3 Lower Plateau Pressure (PPLAT)

• Strategy: FMaintaining the Inspiratory Plateau pressure below 30 cm H2O is essential to minimize the risk of ventilator-induced lung injury and protect lung tissue. This requires careful monitoring and real-time adjustments during mechanical ventilation.

• Application: Regularly monitor plateau pressures and make necessary ventilatory adjustments to ensure that these pressures do not exceed the established threshold. This involves modifying the mechanical ventilation settings based on the patient's respiratory mechanics. To estimate and assess the plateau pressure level on the O-Two e700 ventilator, initiate an Inspiratory Hold by pressing and holding the manual key. The ventilator will transition to the inspiratory hold phase once the pre-set inspiratory time (Ti) is reached. During this phase, the waveform displaying the estimated plateau pressure level will be visible in the graphical representation on the screen (Refer to Figure 1).

www.otwo.com
45A Armthorpe Road, Brampton, ON, Canada, L6T 5M4
Telephone: +1 905 792-OTWO (6896) N.A. Toll Free: +1 800 387 3405
Facsimile: +1 905 799 1339 Email: resuscitation@otwo.com

o_two controlled ventilation

Moe Halawani, MD | O-Two Clinical Specialist

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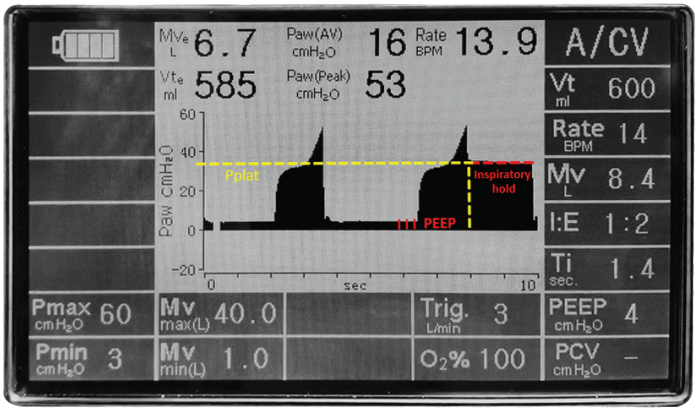

Figure 1: The estimation of Pplat level on the O-Two e700 ventilator.

4 Higher Positive End-Expiratory Pressure (PEEP)

• Strategy: Higher levels of PEEP are conditionally recommended for patients with moderate to severe ARDS to enhance alveolar recruitment, improve oxygenation, and prevent atelectrauma. Studies comparing higher versus lower PEEP strategies have demonstrated that higher PEEP can significantly improve oxygenation levels and the PaO2/FiO2 ratio without markedly increasing risks such as barotrauma or organ failure. However, potential risks associated with higher PEEP include:

1. End-inspiratory alveolar overdistention
2. Increased intrapulmonary shunt
3. Increased dead space
4. Elevated pulmonary vascular resistance
5. Potential development of cor pulmonale

• Application: Due to variability among ARDS patients, specific PEEP values cannot be universally specified. It is essential to individualize PEEP titration based on initial patient assessments. Healthcare providers should start with a moderate PEEP setting, applied according to the initial clinical evaluation of the patient. The optimal PEEP level must be determined through ongoing assessment of lung mechanics and the patient's response to gas exchange. Adjust PEEP according to disease severity, the patient's oxygenation response, and lung compliance. Continuous monitoring ensures that inspiratory plateau pressures do not exceed 30 cm H2O. It is vital to balance the potential benefits of improved oxygenation and lung protection against the risks of increased pulmonary and hemodynamic complications. Careful monitoring helps manage these risks, preventing hemodynamic instability and optimizing therapeutic outcomes.

MEDICAL DISCLAIMER

The medical information provided in these insights is derived from published sources and is intended only for educational and informational purposes. This information aims to enhance understanding and support ongoing learning within the medical community. It is not a substitute for local policies or the clinical judgment of healthcare professionals and does not constitute medical advice, diagnosis, or treatment. It is crucial to follow the officially authorized guidelines of your healthcare or EMS facility. Always consult your institution's specific protocols and policies before making any changes to patient care practices.

REFERENCES

The insights presented on this topic are derived from the following article. For a comprehensive review and more detailed information on this topic, please refer to the original text:

"An Official American Thoracic Society/European Society of Intensive Care Medicine/Society of Critical Care Medicine Clinical Practice Guideline: Mechanical Ventilation in Adult Patients with Acute Respiratory Distress Syndrome," published in the American Journal of Respiratory and Critical Care Medicine, Volume 195, Issue 9, pages 1253–1263, in 2017. The original article can be accessed at: https://doi.org/10.1164/rccm.201703-0548ST for a detailed review.

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45A Armthorpe Road, Brampton, ON, Canada, L6T 5M4
Telephone: +1 905 792-OTWO (6896) N.A. Toll Free: +1 800 387 3405
Facsimile: +1 905 799 1339 Email: resuscitation@otwo.com