Category :**Respiratory: ARDS**

A334 - ***Volume of recruitment as a predictor of lung stress and mortality in acute respiratory distress syndrome patients: reanalysis of a multicenter international randomized clinical trial***

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Introduction:

ARDS decreases aerated lung volume, causing variable lung stress and risk of Ventilator-Induced Lung Injury, despite low tidal volume ventilation. Lung stress assessment is limited to patients with esophageal manometer measurements. Recruitment maneuvers (RM) aim to expand functional lung volume, termed V_{RM}. A prior study in 42 patients correlated low V_{RM} with increased lung stress and mortality [1]. Our study aims to validate these findings in a larger cohort.

Methods:

We performed a post-hoc analysis on EPVent2 randomized controlled trial [2]. We first evaluated the association between V_{RM} and predicted-inspiratory capacity (IC), as predicted using reference equations [3]. Using linear regression models, we then assessed the association between V_{RM}/predicted body weight (PBW) and lung and tidal stress. Lung stress was defined as end-inspiratory transpulmonary pressure and tidal stress as the difference between end-inspiratory and end-expiratory transpulmonary pressure. Logistic regression was used to estimate the association between V_{RM} and 28-day mortality.

Results:

We included 119 patients. V_{RM} was significantly lower than predicted-IC (mean difference 839.34 ± 368.91 mL; $p < .001$) and not correlated with predicted-IC ($R^2 = 0.12$; $p = 0.22$). V_{RM}/PBW ranged between 4.68 and 31.12 mL/kg. Lower V_{RM}/PBW was associated with higher lung stress (ß = 0.33 cmH_2O per 1ml/kg of V_{RM}/PBW decrease, 95% CI 0.46 to 0.20; $p < .001$) and tidal stress (ß = 0.18 cmH_2O per 1ml/kg of V_{RM}/PBW, 95% CI 0.29 to 0.08; $p = .001$), Figure 1. In analyses adjusted for driving pressure, PaO_2/FiO_2, PEEP, plateau pressure, and tidal volume/PBW, V_{RM}/PBW remained independently associated with lung but not tidal stress. V_{RM} did not predict 28-day mortality.

Conclusion:

In ARDS patients, low V_{RM} may predict high lung stress but not mortality.

References:

[1] Beitler JR et al. CCM 44(1):91-9, 2016.
[2] Beitler JR et al. JAMA 321(9):846-857, 2019.
[3] Stocks J et al. ERJ. 8(3):492-506, 1995.

Image :

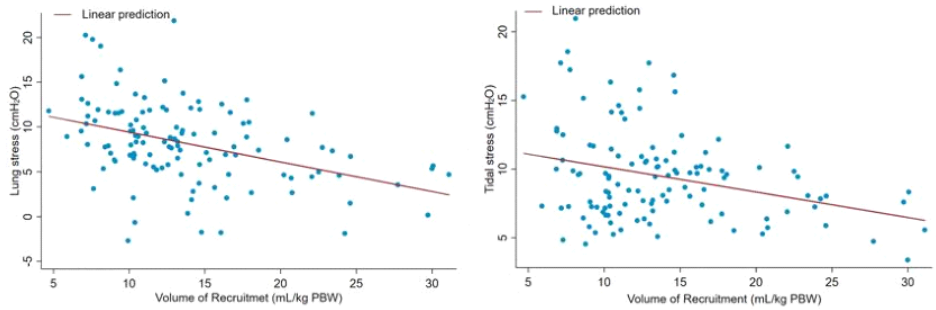

Figure 1. Global Lung Stress Prediction. Left: End-Inspiratory Lung Stress, calculated as transpulmonary pressure during the end-inspiratory pause of a tidal breath. Right: Tidal Lung Stress, calculated as transpulmonary pressure difference between end-inspiratory and end-expiratory pauses during a tidal breath. The figure highlights unadjusted associations between Volume of Recruitment/Predicted Body Weight and both lung and tidal stress.