

## Effective Tandem Mesh Nebulisation of Pulmonary Vasodilator and Bronchodilators in Critical Respiratory Failure

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**Abstract :** Background: Inhaled epoprostenol (iEPO) have been shown to improve PaO<sub>2</sub>:FiO<sub>2</sub> (PF) in combination with bronchodilators (BD). However, there is not an available device to deliver these two therapies concomitantly. We describe a new method to provide this therapy successfully. Objective: To evaluate the response to continuous nebulization of iEPO and intermittent nebulization of Salbutamol/Ipratropium bromide in adults with severe respiratory failure through a double mesh nebulisation in tandem. Methods: This observational study included two mechanical ventilated adults under hourly ventilatory, gasometrical and clinical measurements during 48h. Both had severe respiratory failure treated with continuous iEPO (50 - 200 micrograms/h) and BD (Salbutamol 2.5 mg and Ipratropium bromide 500 mcg every 6 hours) through double mesh nebulisation (Aerogen solo®) placed in tandem in the dry side of the humidificator. The primary endpoints were the variables associated with a positive response to this tandem nebulised therapy (PaFiO<sub>2</sub> index, ROX index). Secondary endpoints were laboratory (ABG) clinical and ventilatory variables. Statistical analysis (SPSS v29) included linear regression and ANOVA. Results: The patients included (n=2) survived, both extubated, one after ECMO therapy. Severe acute respiratory failure had a positive response rate to continuous iEPO and intermittent BD: PaFiO<sub>2</sub> increased (7.40 to 30.91; P75: 27%) as well as ROX index (2.91 to 11.43; P75: 33%). There was a linear correlation of improvement between iEPO with PaFiO<sub>2</sub> (ANOVA, r=0.393, p<0.002) and ROX (r=0.419, p<0.001). iEPO+BD therapy did not show any complications. Conclusion: Continuous and intermittent mesh tandem nebulisation can be effectively delivered with this method with a positive effect in ventilatory parameters without observed complications. Randomised studies will be able to provide reassurance in this new therapy.

**Keywords :** tandem, mesh, nebulisers, pulmonary, vasoldilators, bronchodilators, respiratory, failure

**Conference Title :** ICACCM 2024 : International Conference on Anesthesiology and Critical Care Medicine

**Conference Location :** Cape Town, South Africa

**Conference Dates :** April 11-12, 2024